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By-Agenbroad, James E.; And Others

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Included in this volume of appendices to LI 000 979 are acquisitions flow charts; a current operations questionnaire; an algorithm for splitting the Library of Congress call number; analysis of the Machine-Readable Cataloging (MARC II) format; production problems and decisions; operating procedures for information transmittal in the New England Library Information Network; compression word coding techniques (transition distance coding, alphacheck, recursive decomposition, and Soundex); and sample cards and labels. (CC)

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ED026079

NELINET - NEW ENGLAND LIBRARY INFORMATION NETWORK

PROGRESS REPORT

JULY 1, 1967 - MARCH 30, 1968

SYSTEMS DESIGN AND PILOT OPERATION OF A REGIONAL CENTER FOR TECHNICAL PROCESSING FOR THE LIBRARIES OF THE NEW ENGLAND STATE UNIVERSITIES

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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VOLUME II - APPENDICES

PREPARED BY

JAMES E. AGENBROAD, LAWRENCE F. BUCKLAND, ANN T. CURRAN,
DONALD D. HODGINS, WILLIAM R. NUGENT, ROBERT H. SIMMONS

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APRIL 5, 1968

*new concepts in information organization, processing, and presentation

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806 MASSACHUSETTS AVENUE, CAMBRIDGE, MASSACHUSETTS 02139, TEL. (617) 547-1750
146 MAIN STREET, MAYNARD, MASSACHUSETTS 01754, TEL. (617) 897-8815
927 15TH STREET, N. W., WASHINGTON, D. C. 20005, TEL. (202) 638-6862

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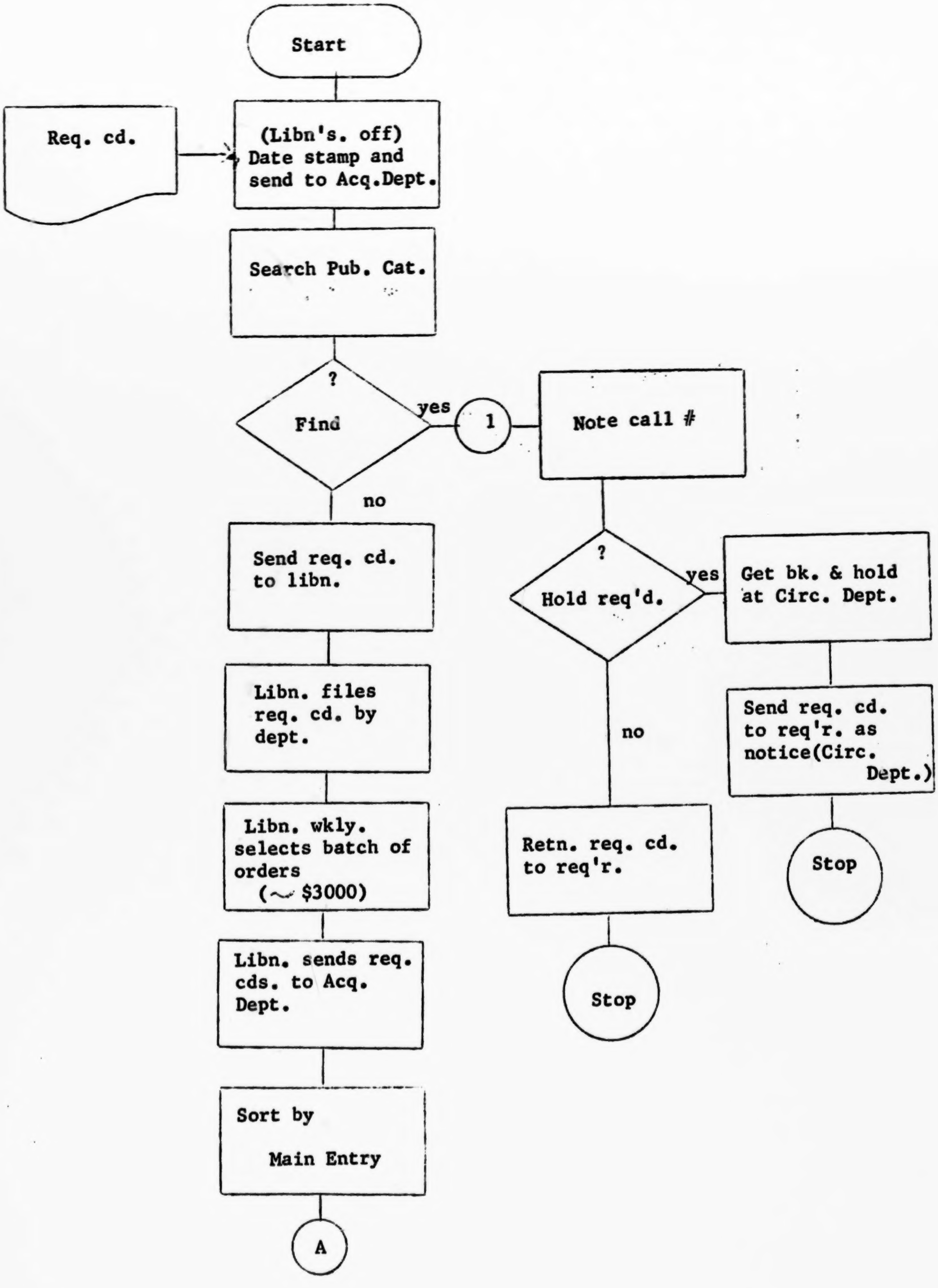
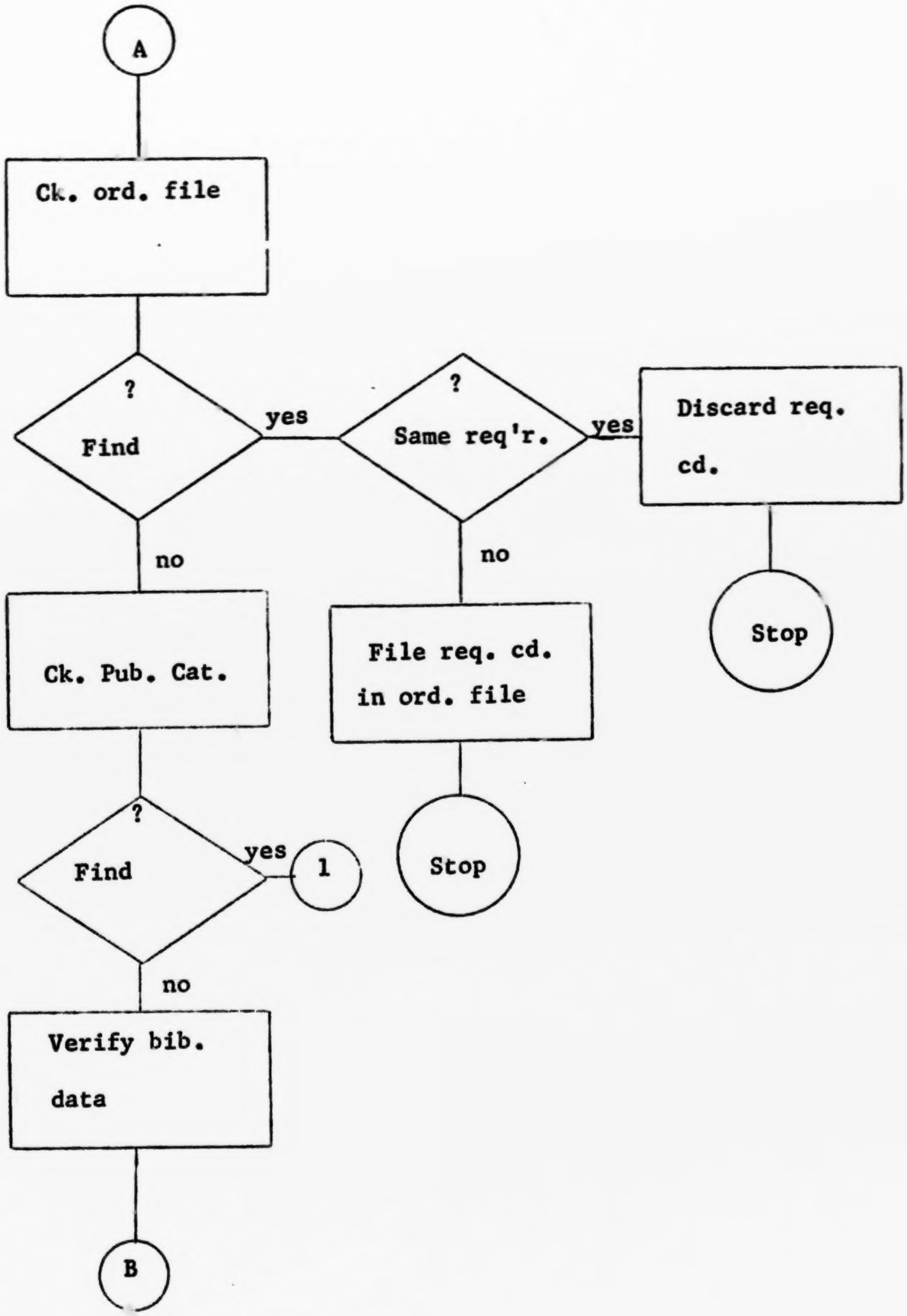
APPENDIX A

A - 1

Library A--Acquisitions Department--Ordering

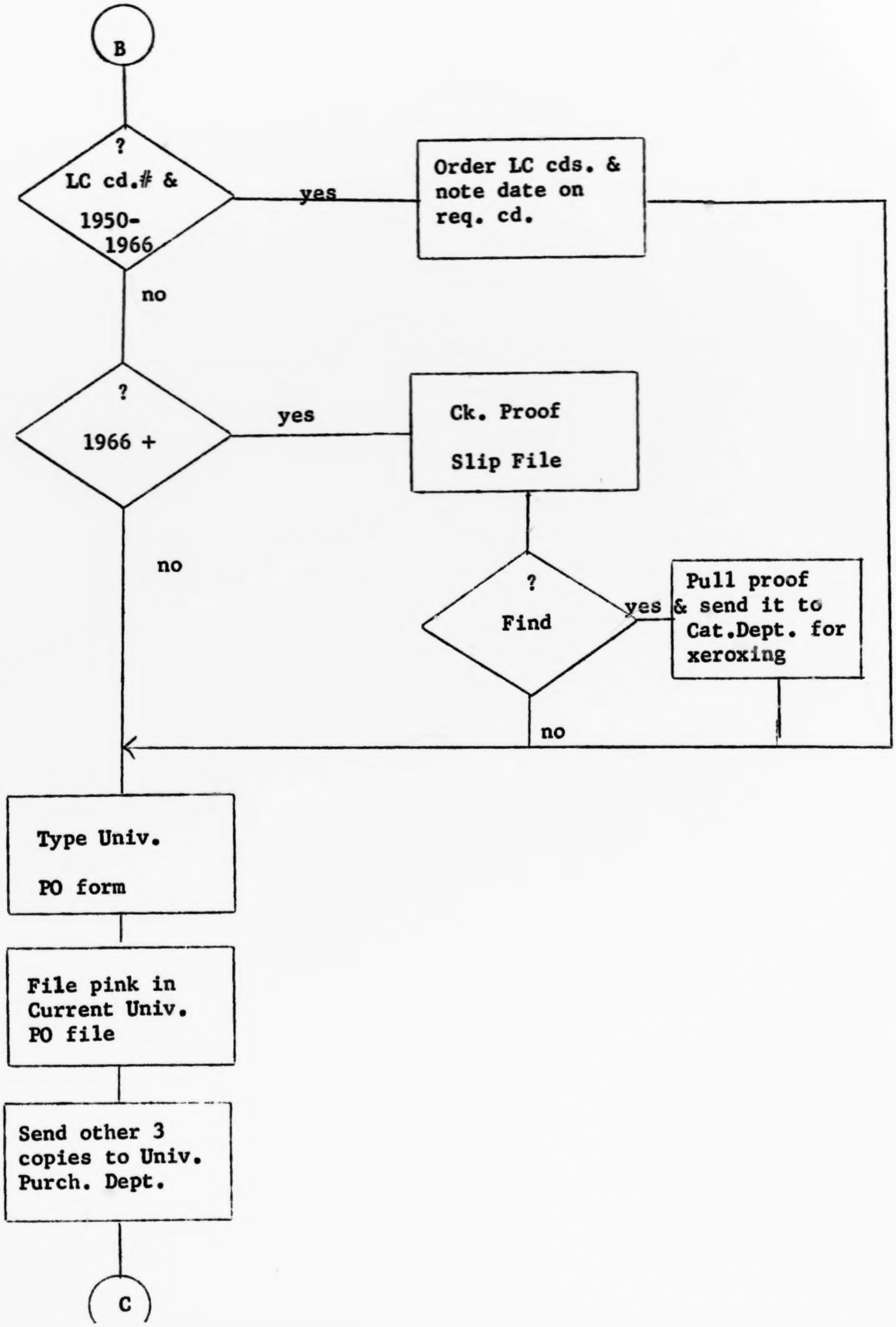

Start
Req. cd.
(Libn's. off) Date stamp and send to Acq.Dept.
Search Pub. Cat.
?
Find
yes
1
Note call #
no
Send req. cd. to libn.
?
Hold req'd.
yes
Get bk. & hold at Circ. Dept.
Libn. files req. cd. by dept.
no
Send req. cd. to req'r. as notice(Circ. Dept.)
Libn. wkly. selects batch of orders (~ $3000)
Retn. req. cd. to req'r.
Stop
Libn. sends req. cds. to Acq. Dept.
Stop
Sort by Main Entry
A

Library A--Acquisitions Department--Ordering

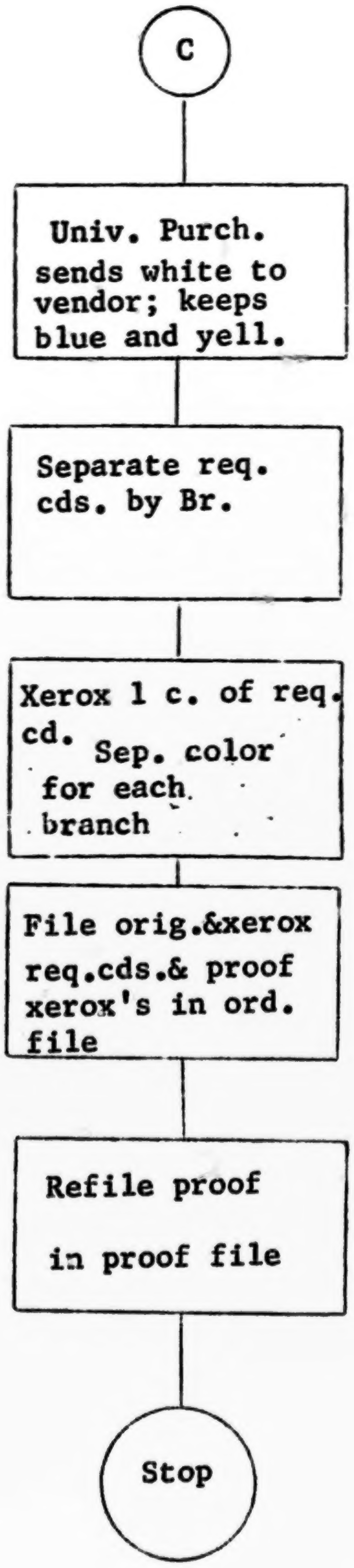

A
Ck. ord. file
?
Find
yes
?
Same req'r.
yes
Discard req. cd.
Stop
no
no
Ck. Pub. Cat.
File req. cd. in ord. file
Stop
?
Find
yes
1
no
Verify bib. data
B

A - 3

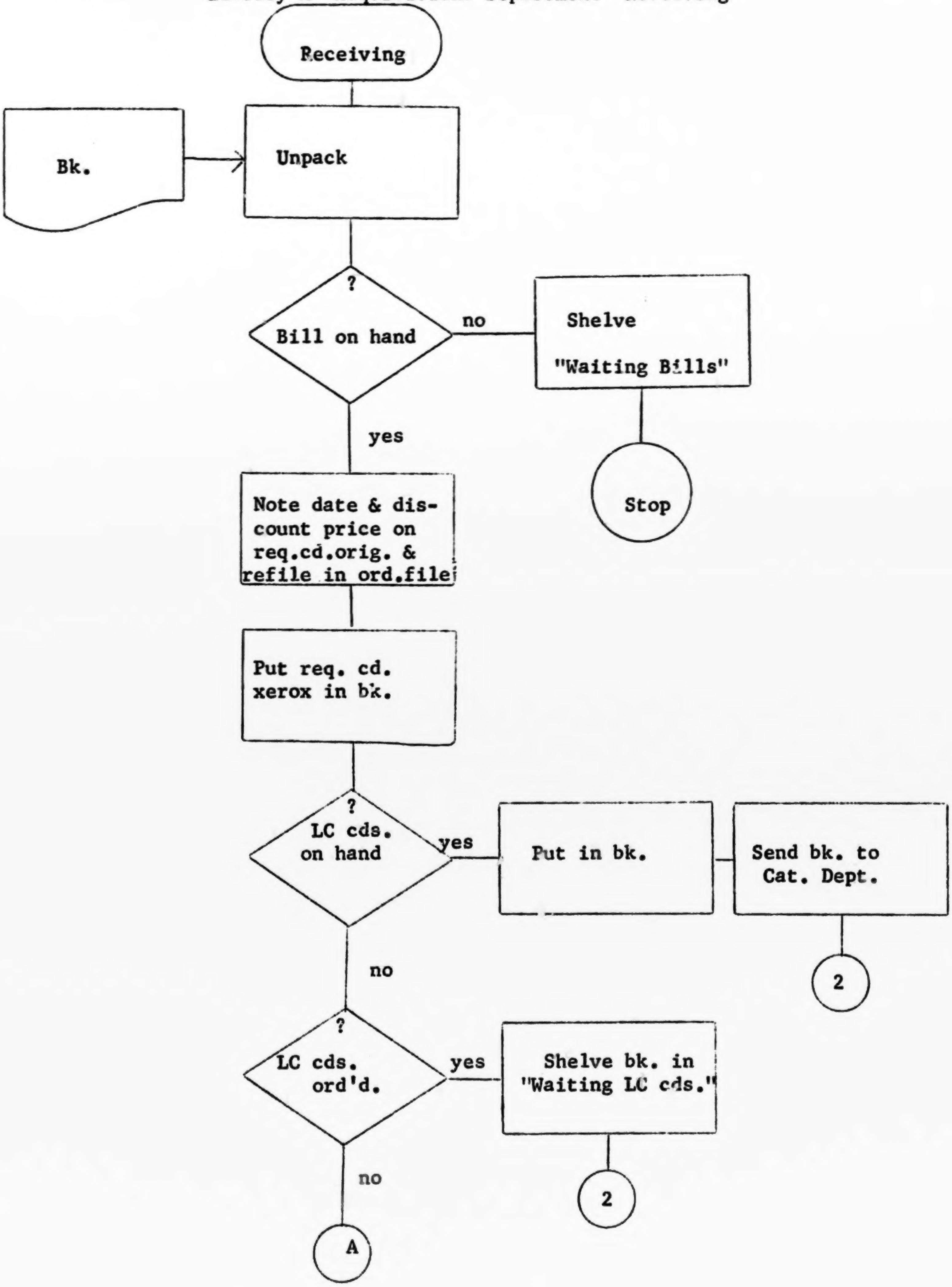
Library A--Acquisitions Department--Ordering


B
?
LC cd.# &
1950-
1966
yes
Order LC cds. &
note date on
req. cd.
no
?
1966 +
yes
Ck. Proof
Slip File
no
?
Find
yes
Pull proof
& send it to
Cat.Dept. for
xeroxing
no
Type Univ.
PO form
File pink in
Current Univ.
PO file
Send other 3
copies to Univ.
Purch. Dept.
C

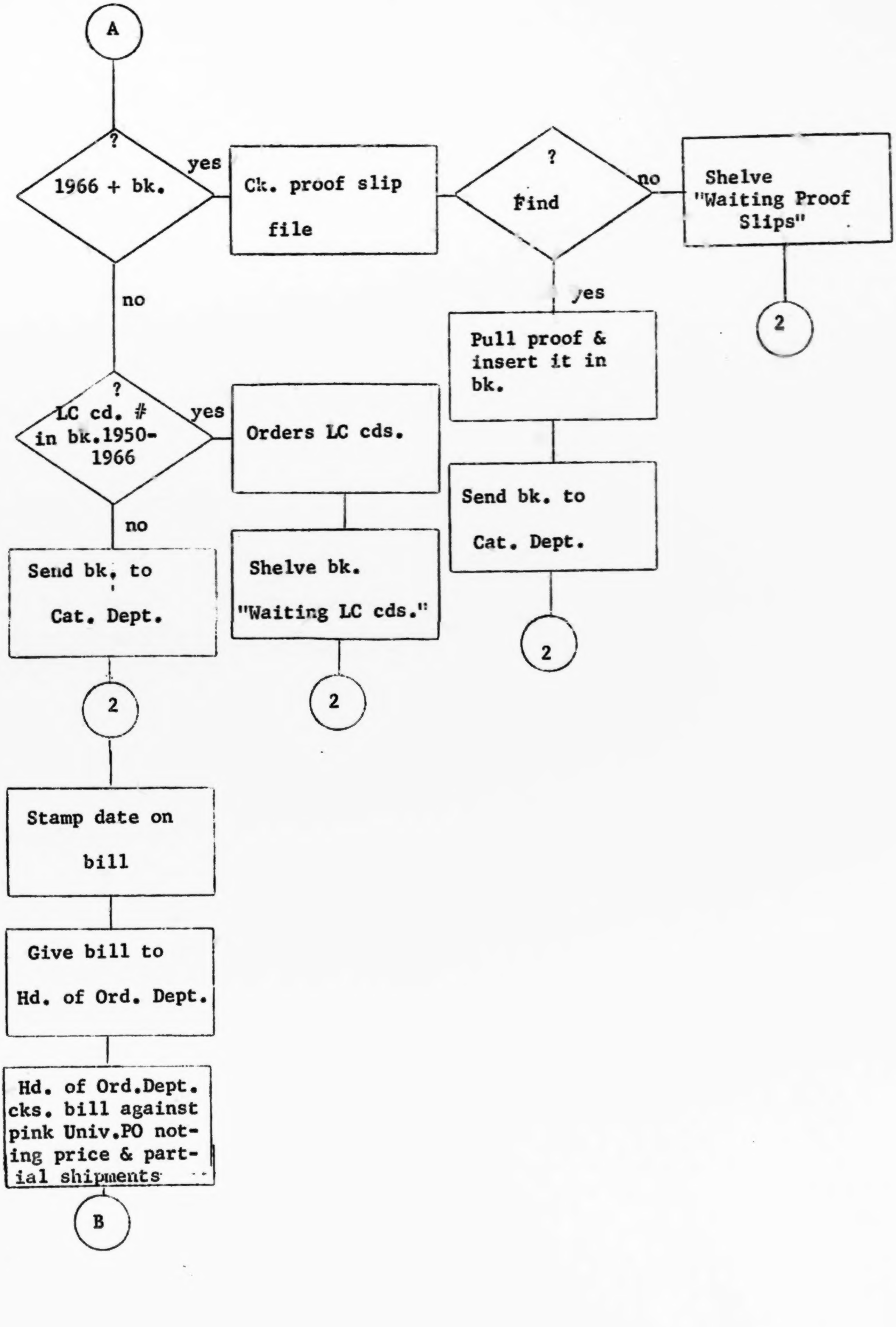
Library A--Acquisitions Department--Ordering


C
Univ. Purch. sends white to vendor; keeps blue and yell.
Separate req. cds. by Br.
Xerox 1 c. of req. cd. Sep. color for each branch
File orig.&xerox req.cds.& proof xerox's in ord. file
Refile proof in proof file
Stop

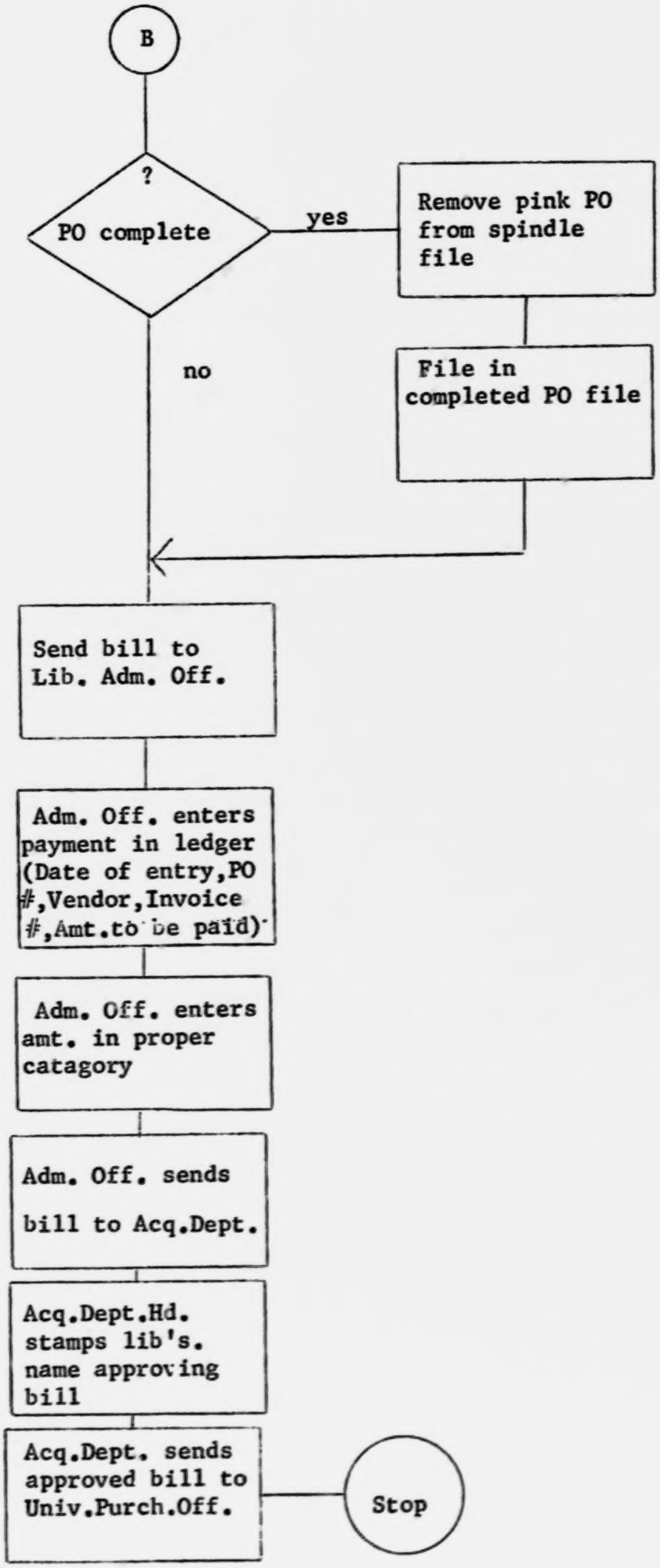
Library A--Acquisitions Department--Receiving


Receiving
Bk.
Unpack
?
Bill on hand
no
Shelve "Waiting Bills"
Stop
yes
Note date & discount price on req.cd.orig. & refile in ord.file
Put req. cd. xerox in bk.
?
LC cds. on hand
yes
Put in bk.
Send bk. to Cat. Dept.
2
no
?
LC cds. ord'd.
yes
Shelve bk. in "Waiting LC cds."
2
no
A

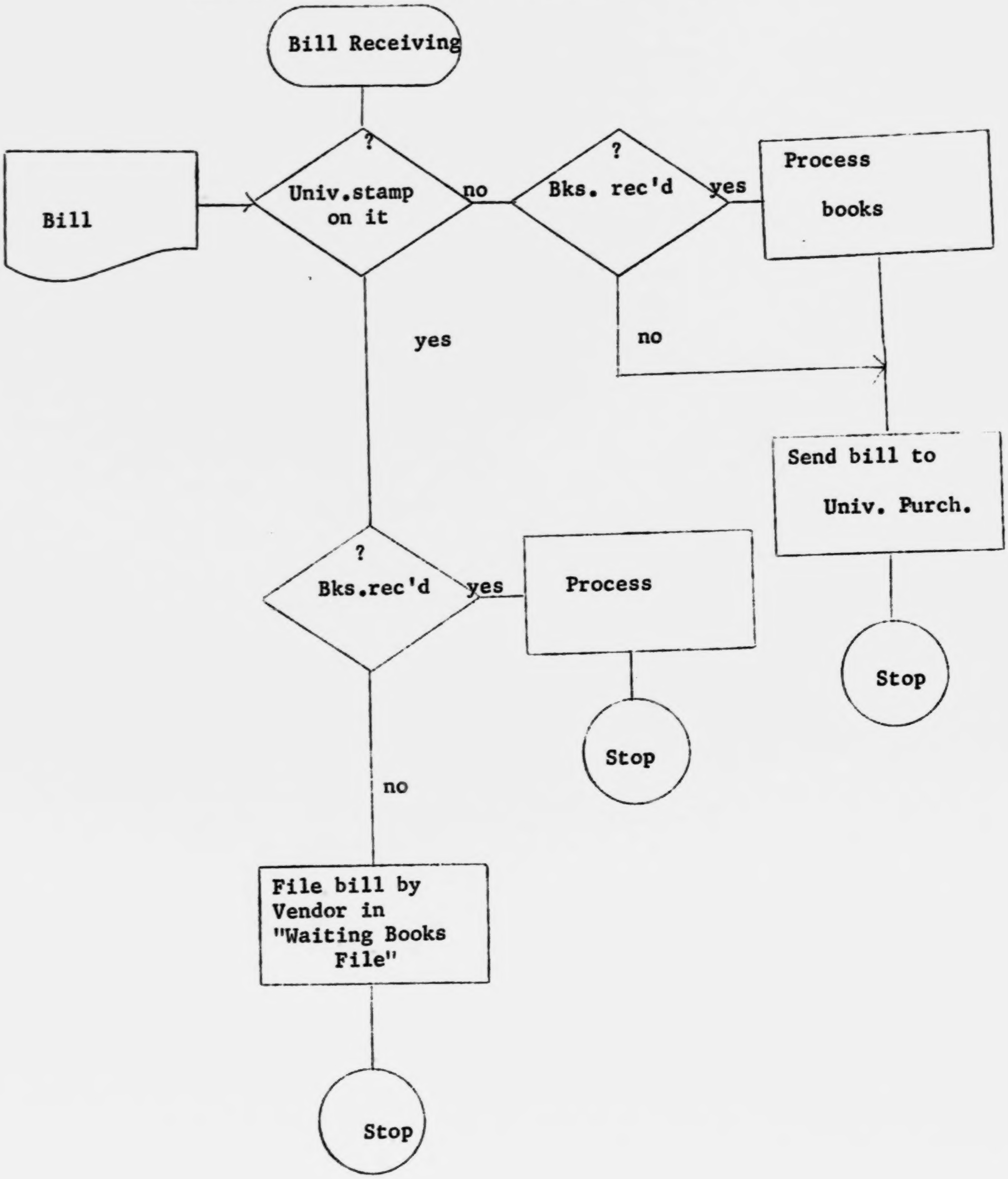
Library A--Acquisitions Department--Receiving


A
?
1966 + bk.
yes
Ck. proof slip file
?
Find
no
Shelve "Waiting Proof Slips"
2
yes
Pull proof & insert it in bk.
Send bk. to Cat. Dept.
2
no
?
LC cd. # in bk.1950-1966
yes
Orders LC cds.
Shelve bk. "Waiting LC cds."
2
no
Send bk. to Cat. Dept.
2
Stamp date on bill
Give bill to Hd. of Ord. Dept.
Hd. of Ord.Dept. cks. bill against pink Univ.PO noting price & partial shipments
B

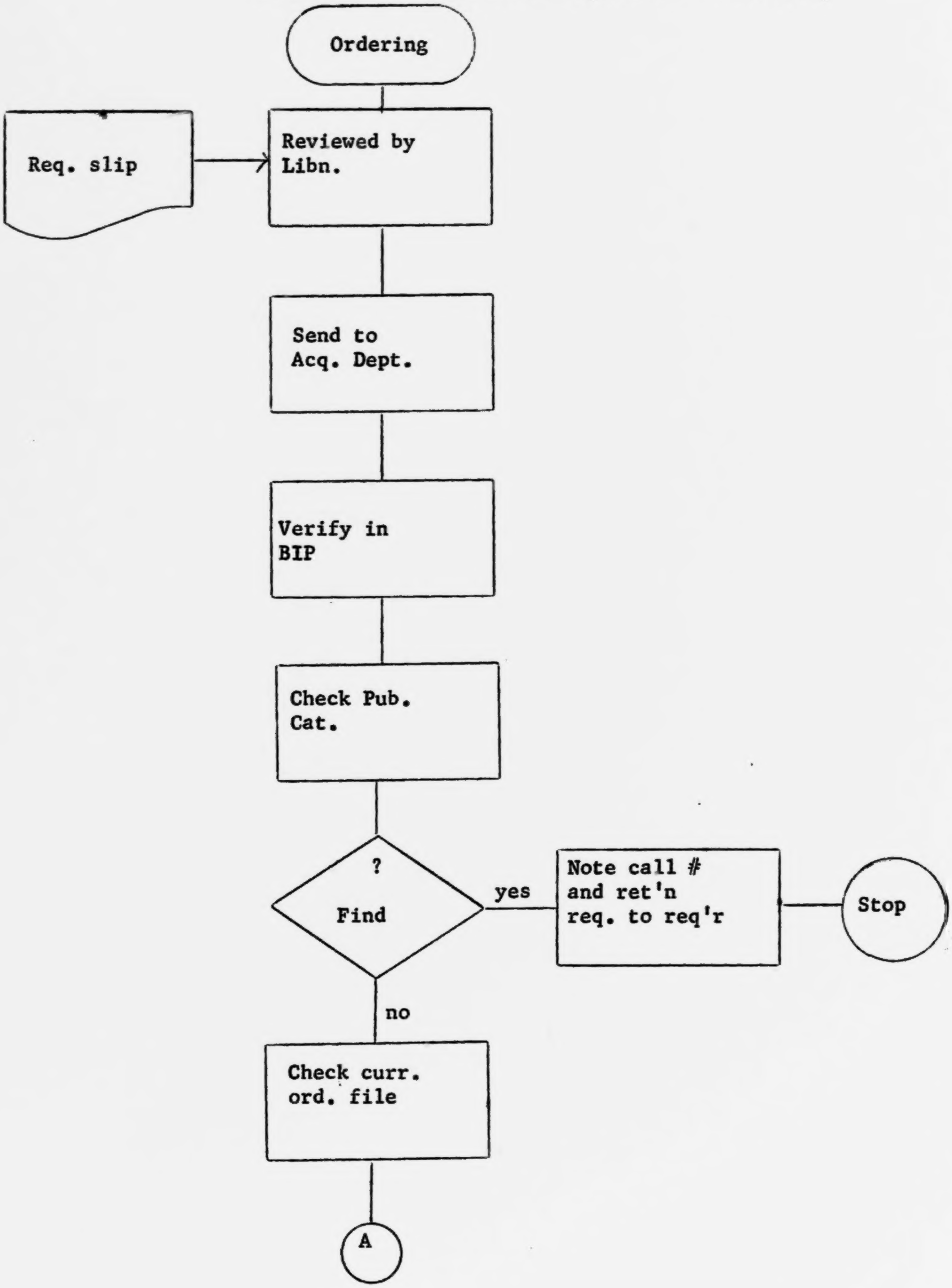
Library A--Acquisitions Department--Receiving


B
?
PO complete
yes
Remove pink PO from spindle file
File in completed PO file
no
Send bill to Lib. Adm. Off.
Adm. Off. enters payment in ledger (Date of entry,PO #,Vendor,Invoice #,Amt.to be paid)
Adm. Off. enters amt. in proper catagory
Adm. Off. sends bill to Acq.Dept.
Acq.Dept.Hd. stamps lib's. name approving bill
Acq.Dept. sends approved bill to Univ.Purch.Off.
Stop

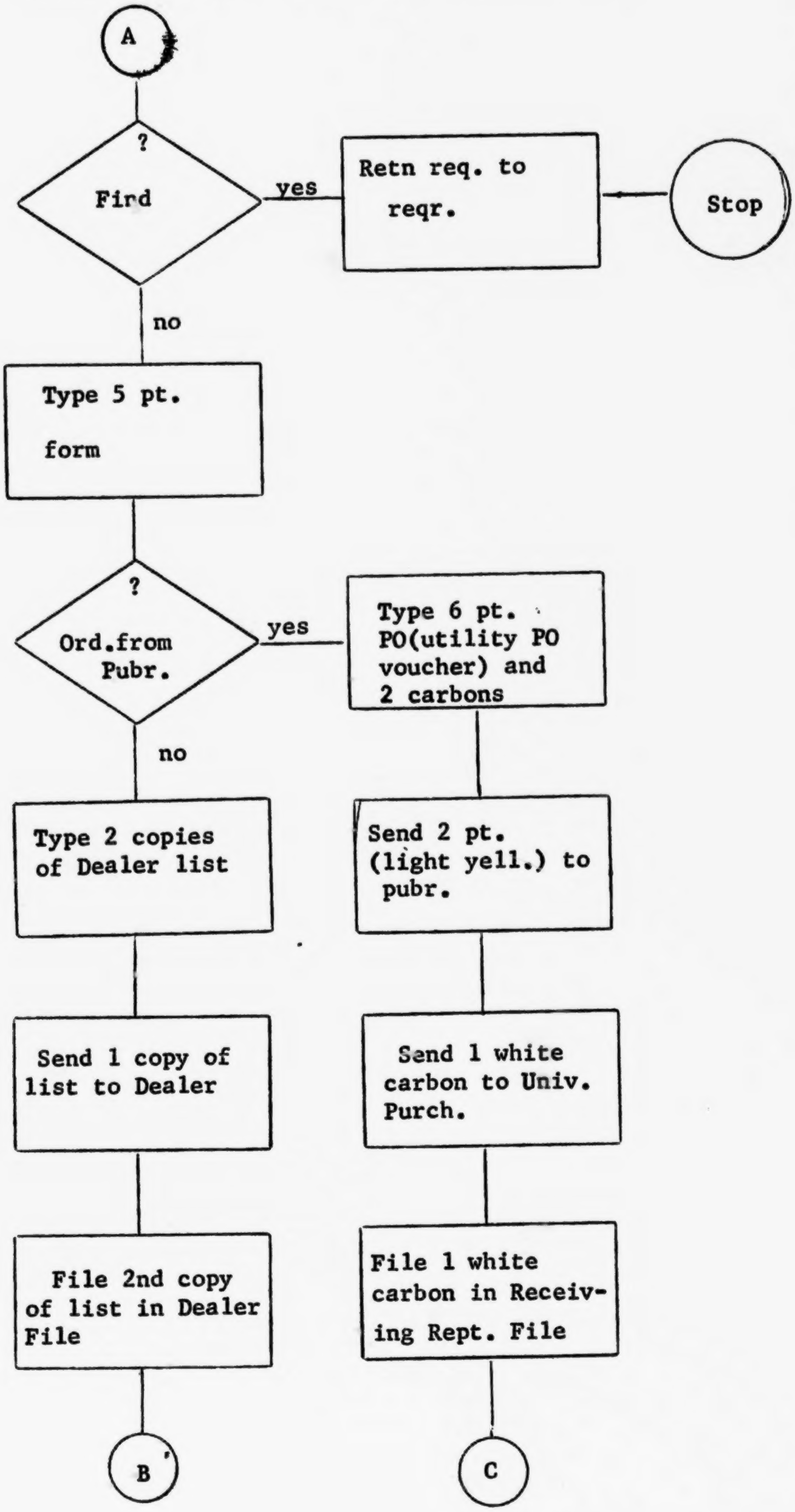
Library A--Acquisitions Department--Receiving


Bill Receiving
Bill
?
Univ.stamp on it
no
?
Bks. rec'd
yes
Process books
no
yes
Send bill to Univ. Purch.
Stop
?
Bks.rec'd
yes
Process
Stop
no
File bill by Vendor in "Waiting Books File"
Stop

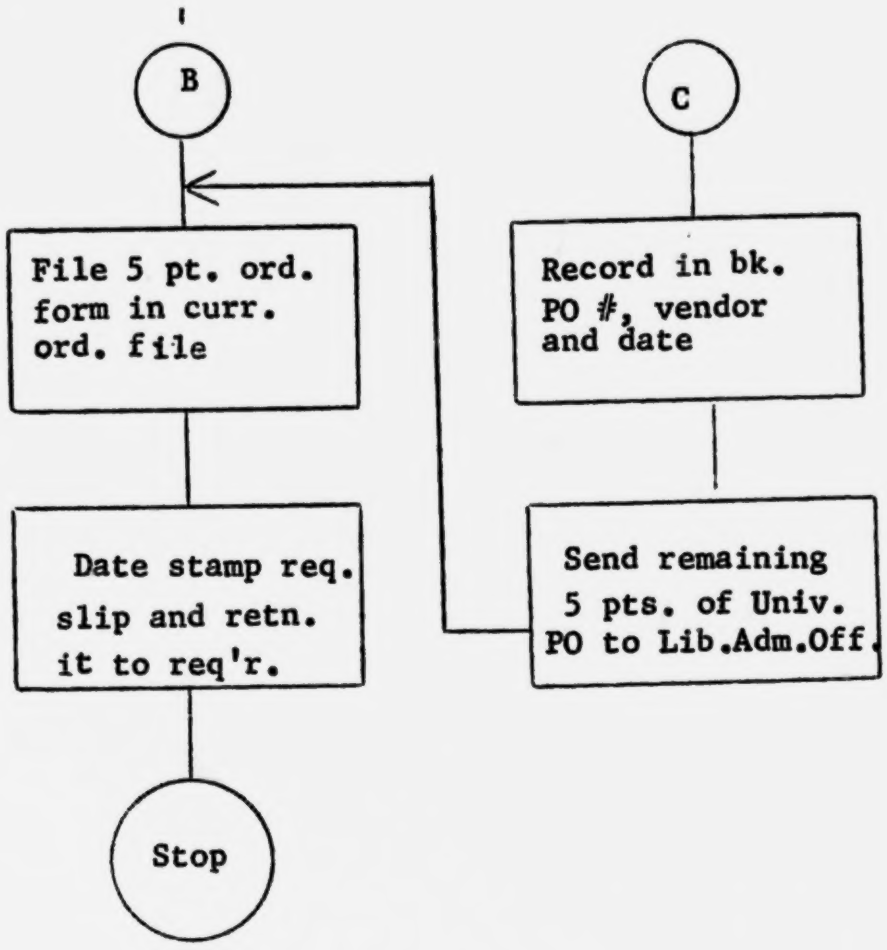
Library B -- Acquisitions Department -- Ordering


Ordering
Req. slip
Reviewed by Libn.
Send to Acq. Dept.
Verify in BIP
Check Pub. Cat.
?
Find
yes
Note call # and ret'n req. to req'r
Stop
no
Check curr. ord. file
A

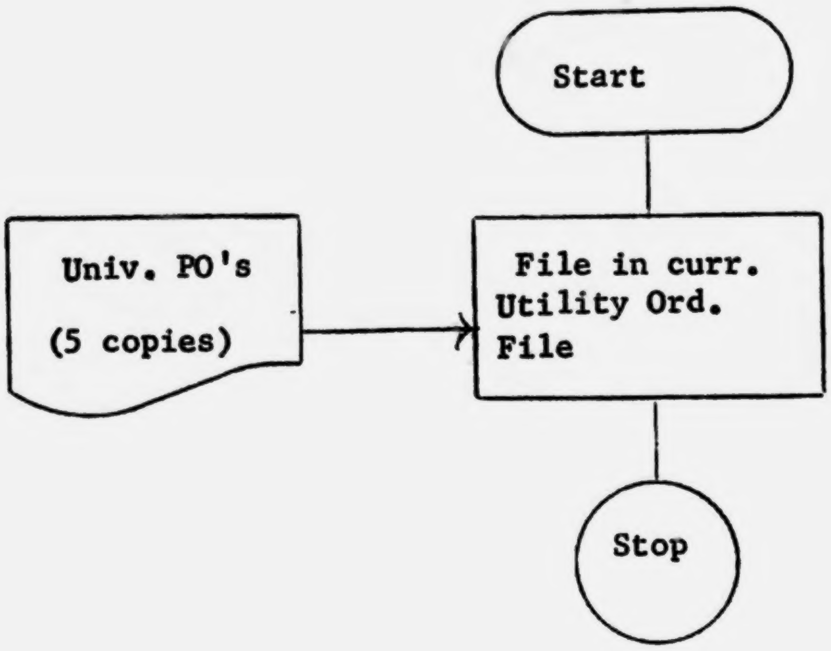
Library B--Acquisitions Department--Ordering


A
?
Fird
yes
Retn req. to reqr.
Stop
no
Type 5 pt. form
?
Ord.from Pubr.
yes
Type 6 pt. PO(utility PO voucher) and 2 carbons
no
Type 2 copies of Dealer list
Send 2 pt. (light yell.) to pubr.
Send 1 copy of list to Dealer
Send 1 white carbon to Univ. Purch.
File 2nd copy of list in Dealer File
File 1 white carbon in Receiving Rept. File
B
C

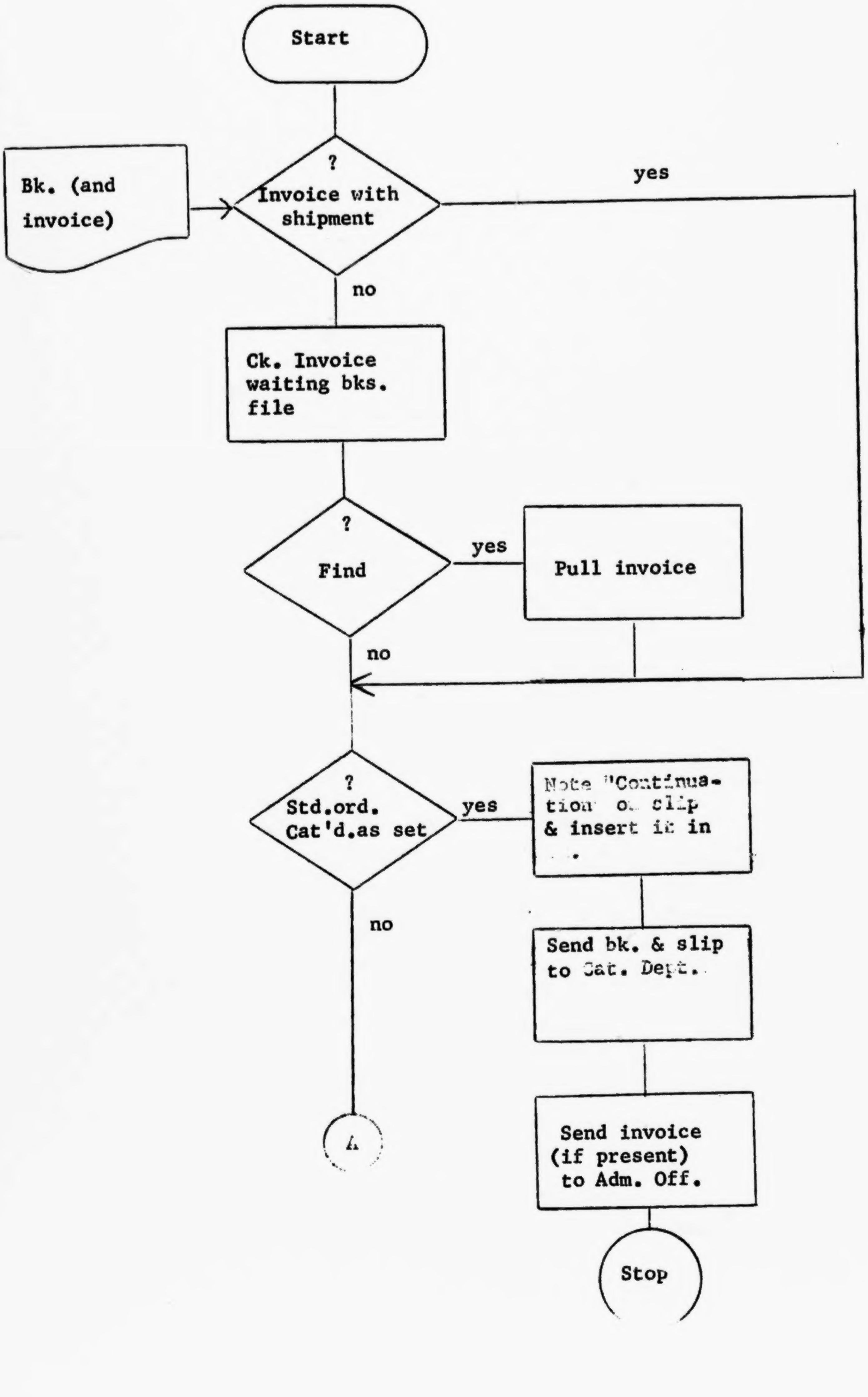
brary B--Acquisitions Department--Ordering


B
C
File 5 pt. ord. form in curr. ord. file
Record in bk. PO #, vendor and date
Date stamp req. slip and retn. it to req'r.
Send remaining 5 pts. of Univ. PO to Lib.Adm.Off.
Stop

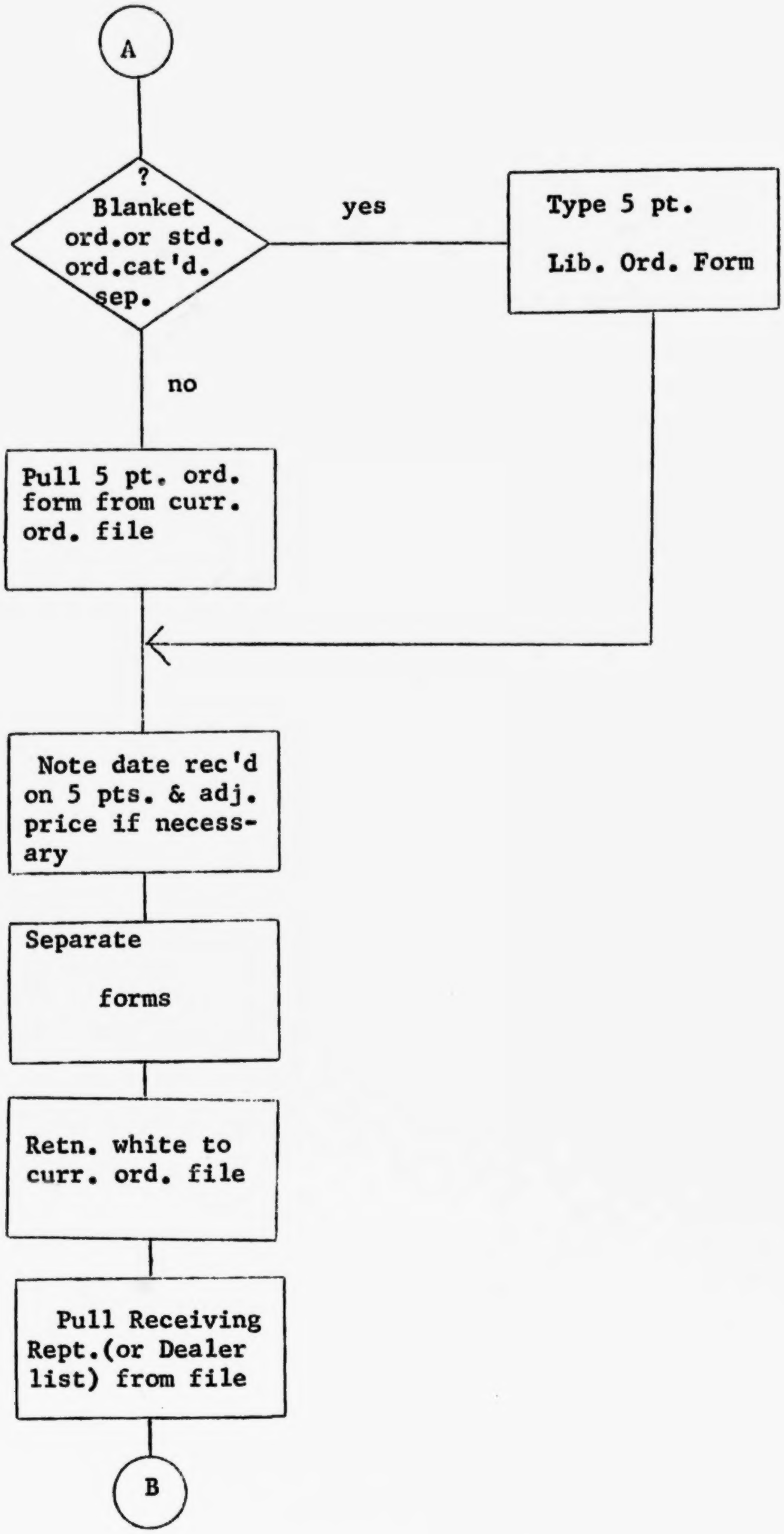
Library B--Library Administration Office--
--Ordering--


Start
Univ. PO's
(5 copies)
File in curr. Utility Ord. File
Stop

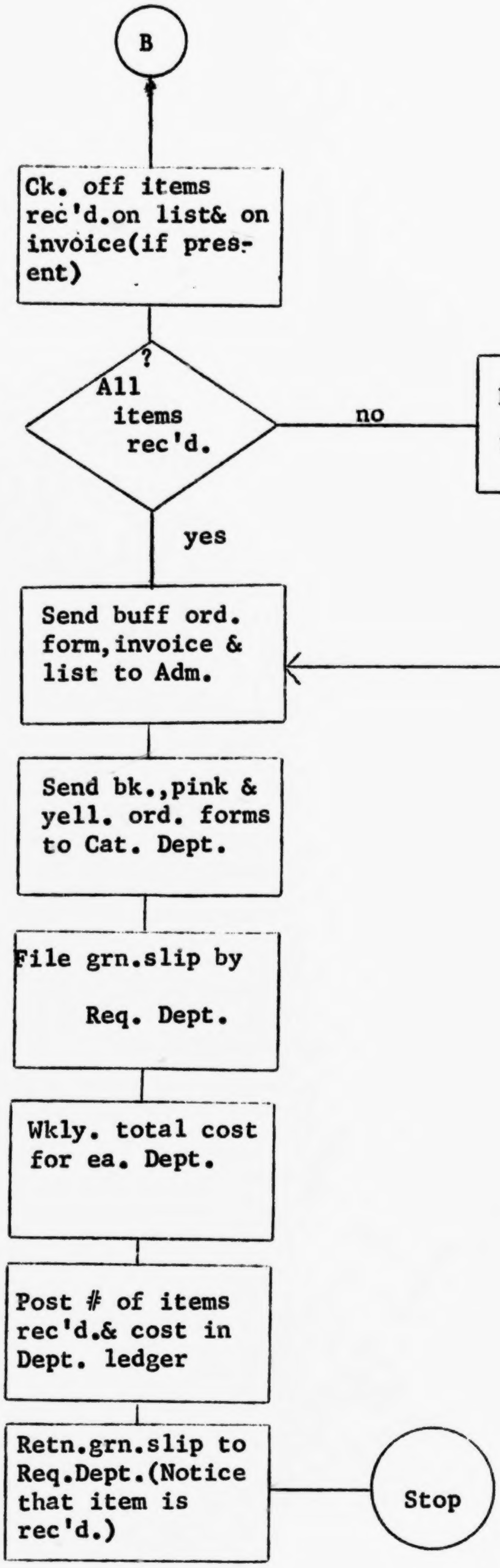
Library B--Acquisitions Department--Receiving


Start
Bk. (and invoice)
?
Invoice with shipment
yes
no
Ck. Invoice waiting bks. file
?
Find
yes
Pull invoice
no
?
Std.ord. Cat'd.as set
yes
Note "Continuation" on slip & insert it in [illegible].
Send bk. & slip to Cat. Dept.
Send invoice (if present) to Adm. Off.
Stop
no
A

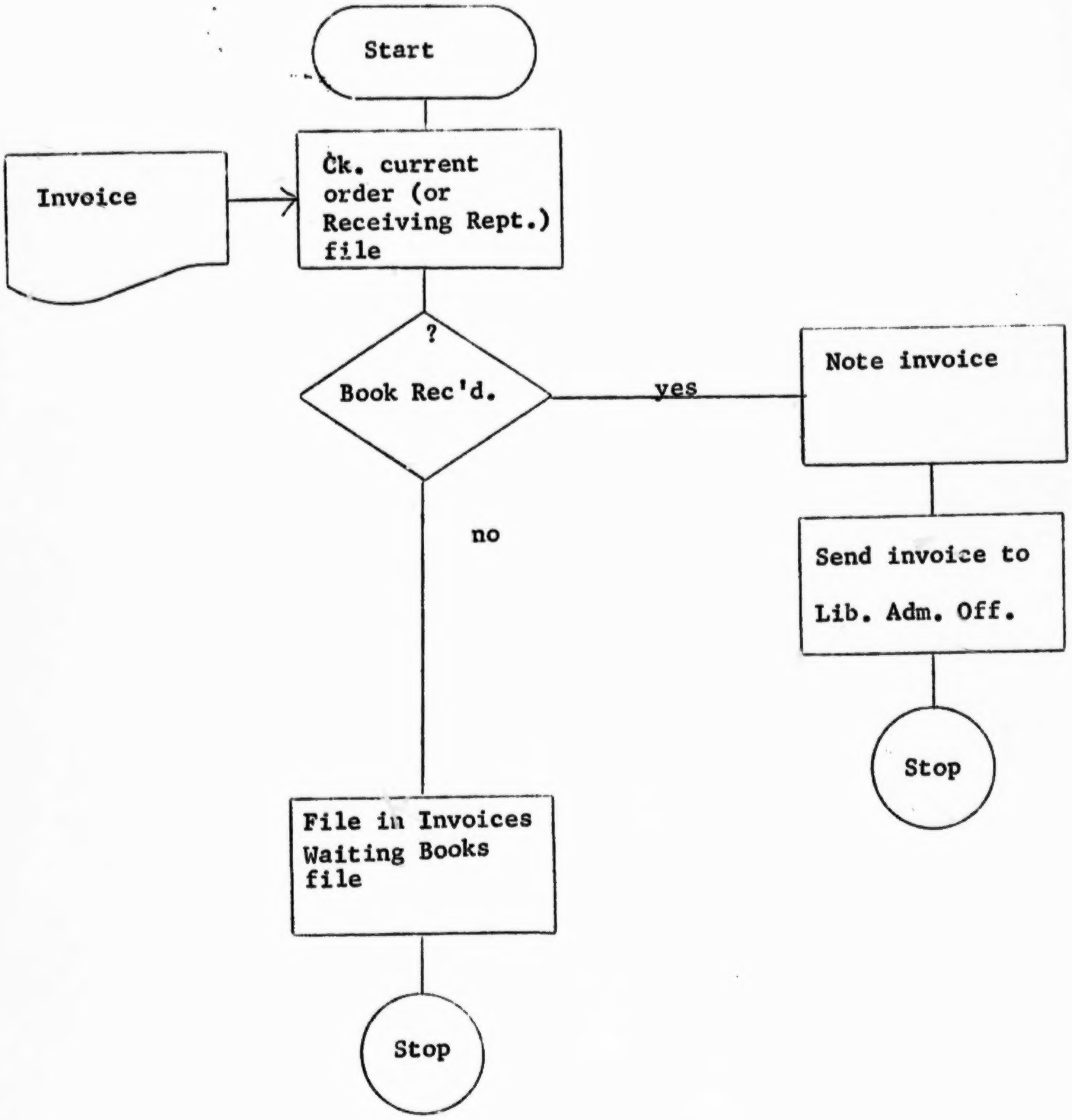
Library B--Acquisitions Department--Receiving


A
?
Blanket ord.or std. ord.cat'd. sep.
yes
Type 5 pt. Lib. Ord. Form
no
Pull 5 pt. ord. form from curr. ord. file
Note date rec'd on 5 pts. & adj. price if necessary
Separate forms
Retn. white to curr. ord. file
Pull Receiving Rept.(or Dealer list) from file
B

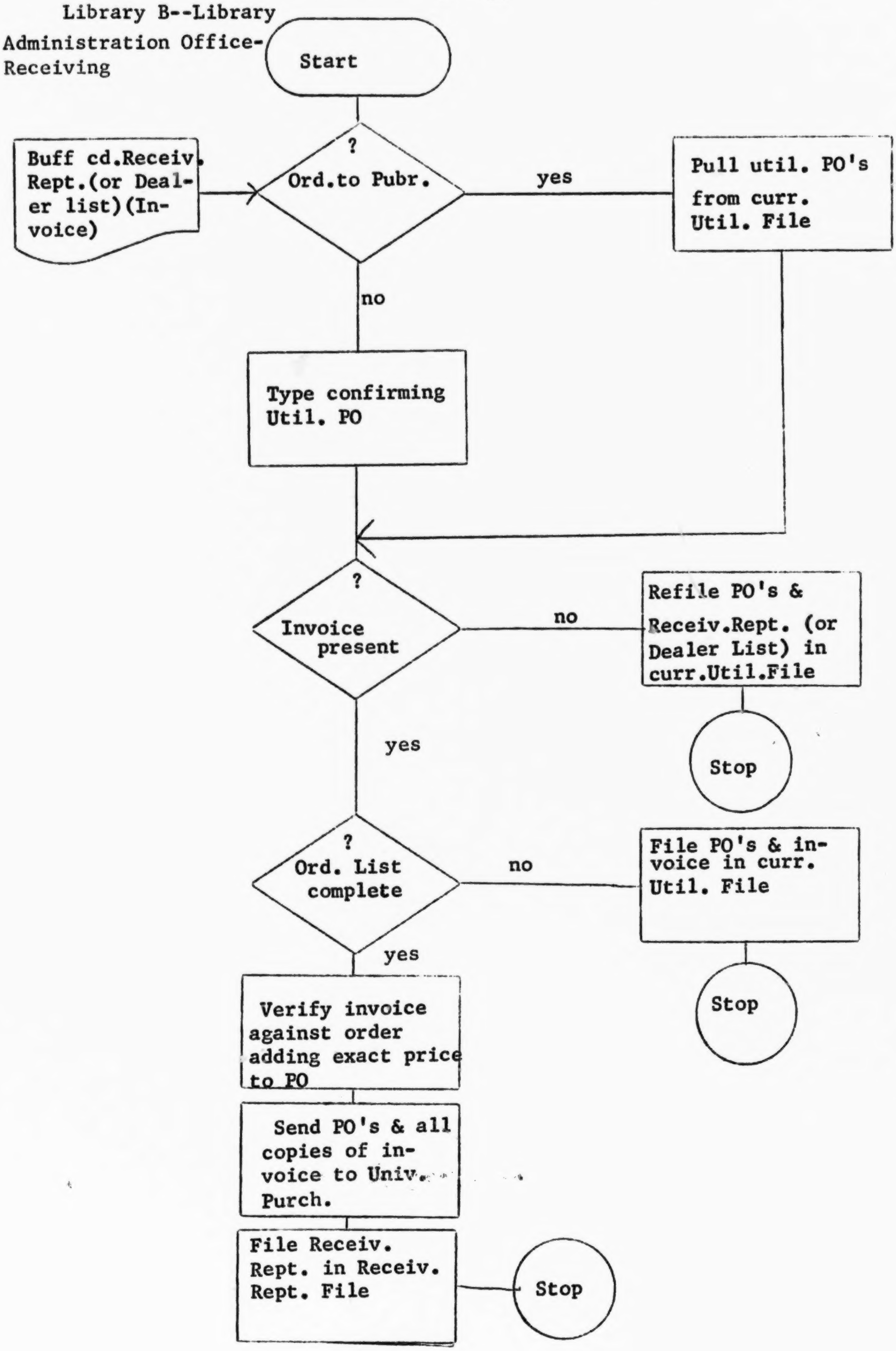
Library B--Acquisitions Department--Receiving


B
Ck. off items rec'd.on list& on invoice(if present)
? All items rec'd.
no
Retn. list to file
yes
Send buff ord. form,invoice & list to Adm.
Send bk.,pink & yell. ord. forms to Cat. Dept.
File grn.slip by Req. Dept.
Wkly. total cost for ea. Dept.
Post # of items rec'd.& cost in Dept. ledger
Retn.grn.slip to Req.Dept.(Notice that item is rec'd.)
Stop

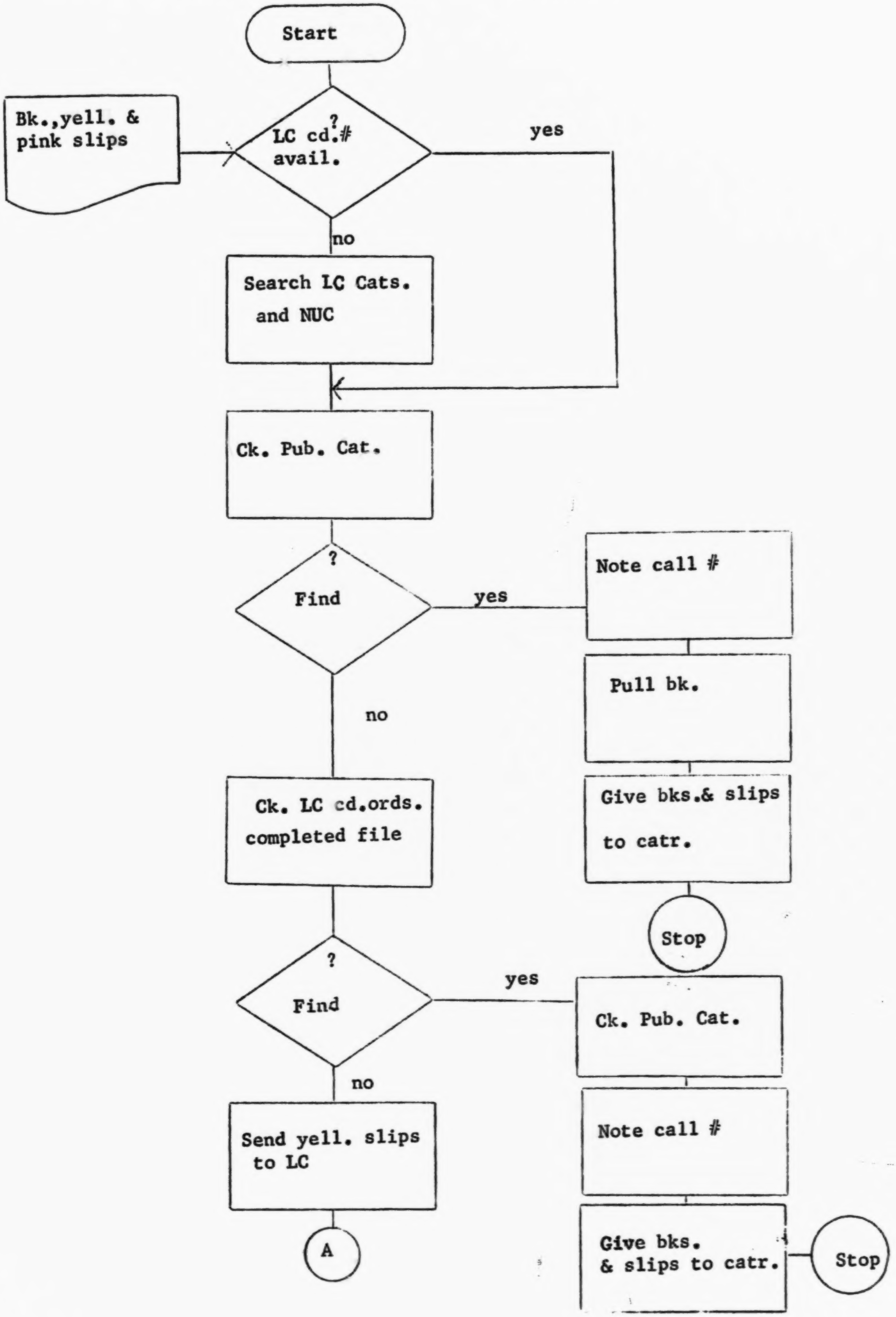
Library B--Acquisitions Department--Receiving


Start
Invoice
Ck. current order (or Receiving Rept.) file
?
Book Rec'd.
yes
Note invoice
Send invoice to Lib. Adm. Off.
Stop
no
File in Invoices Waiting Books file
Stop

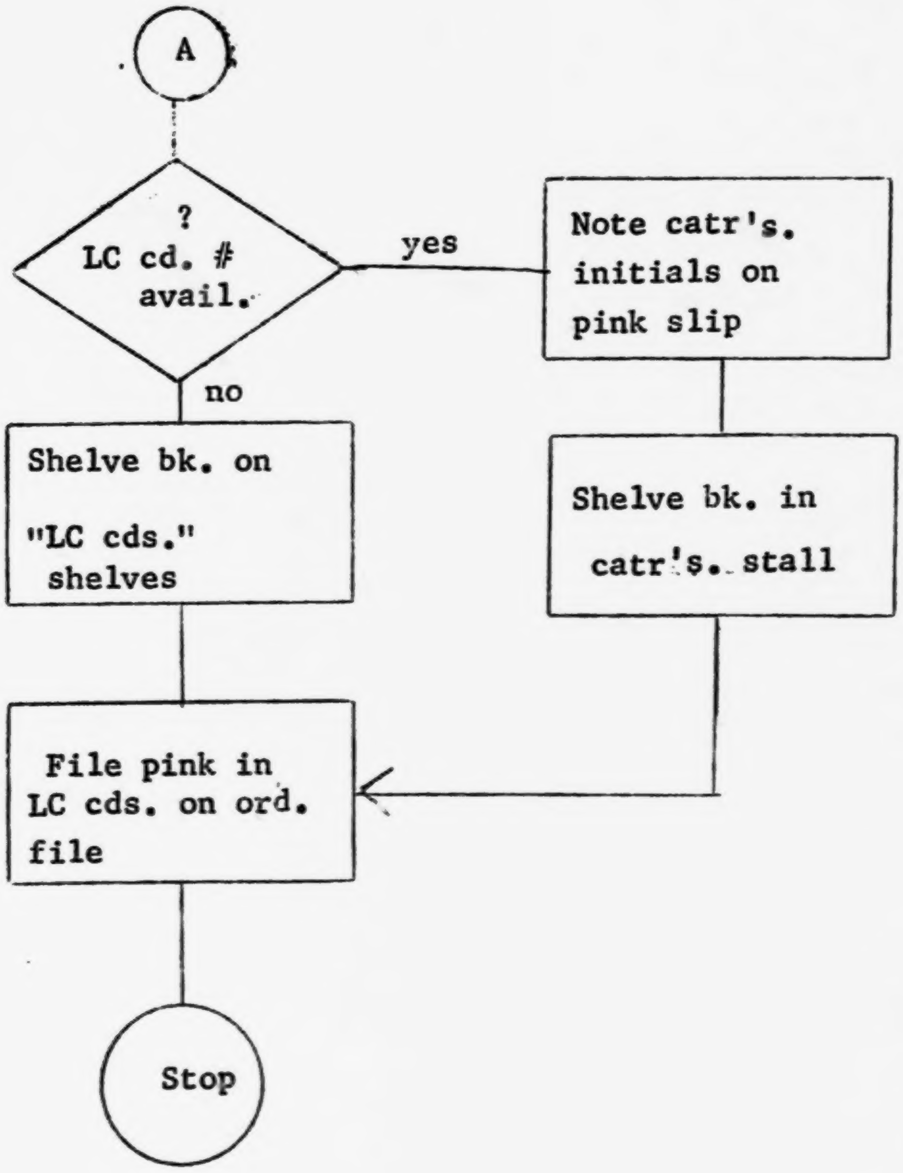
Library B--Library
Administration Office-
Receiving


Start
Buff cd.Receiv. Rept.(or Dealer list)(Invoice)
?
Ord.to Pubr.
yes
Pull util. PO's from curr. Util. File
no
Type confirming Util. PO
?
Invoice present
no
Refile PO's & Receiv.Rept. (or Dealer List) in curr.Util.File
Stop
yes
?
Ord. List complete
no
File PO's & invoice in curr. Util. File
Stop
yes
Verify invoice against order adding exact price to PO
Send PO's & all copies of invoice to Univ. Purch.
File Receiv. Rept. in Receiv. Rept. File
Stop

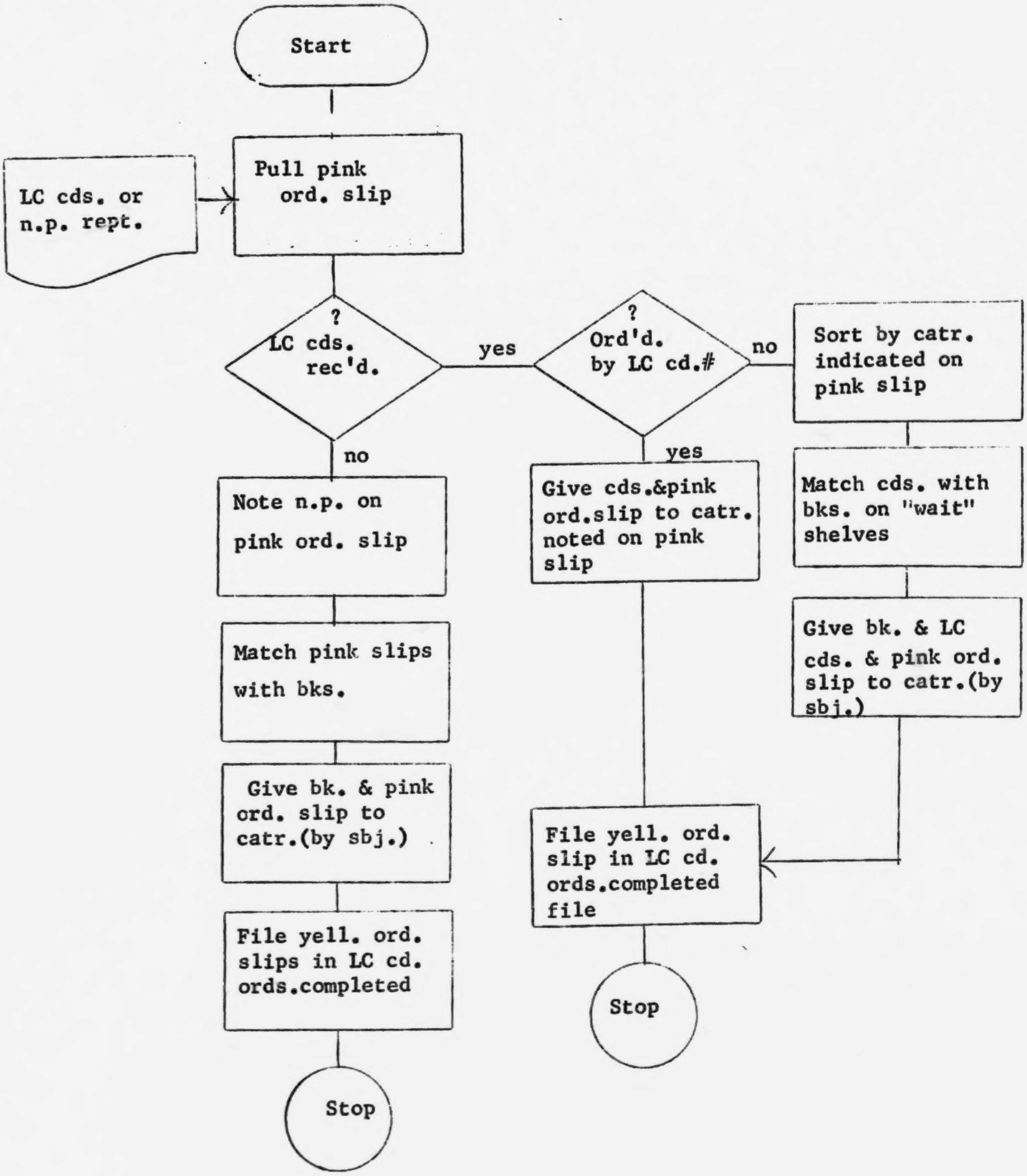
Library D--Catalog Department--Ordering LC Cards


Start
Bk.,yell. & pink slips
LC cd.# avail. ?
yes
no
Search LC Cats. and NUC
Ck. Pub. Cat.
Find ?
yes
Note call #
Pull bk.
Give bks.& slips to catr.
Stop
no
Ck. LC cd.ords. completed file
Find ?
yes
Ck. Pub. Cat.
Note call #
Give bks. & slips to catr.
Stop
no
Send yell. slips to LC
A

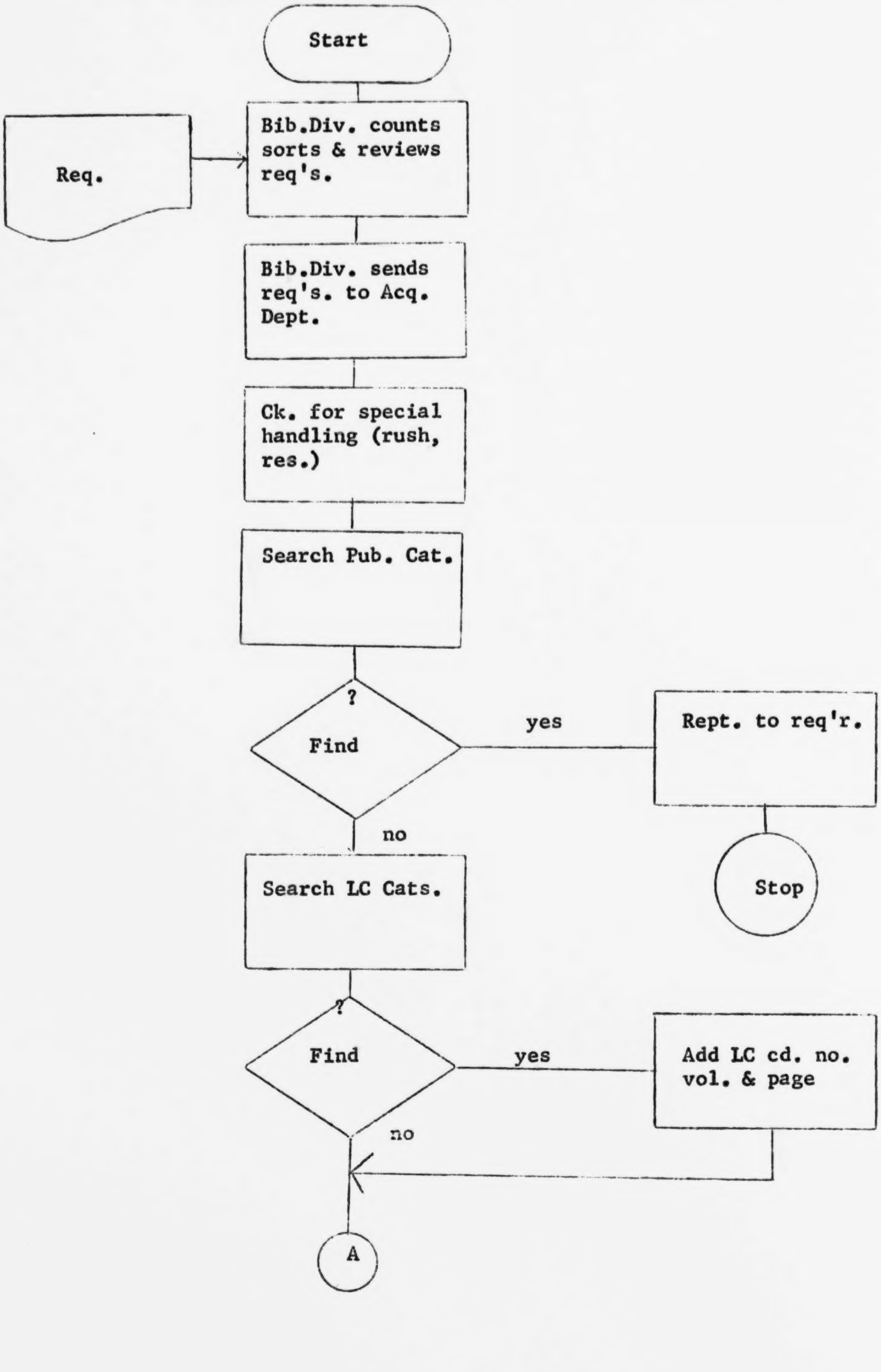
Library B--Catalog Department--Ordering LC Cards


A
?
LC cd. #
avail.
yes
no
Note catr's.
initials on
pink slip
Shelve bk. on
"LC cds."
shelves
Shelve bk. in
catr's. stall
File pink in
LC cds. on ord.
file
Stop

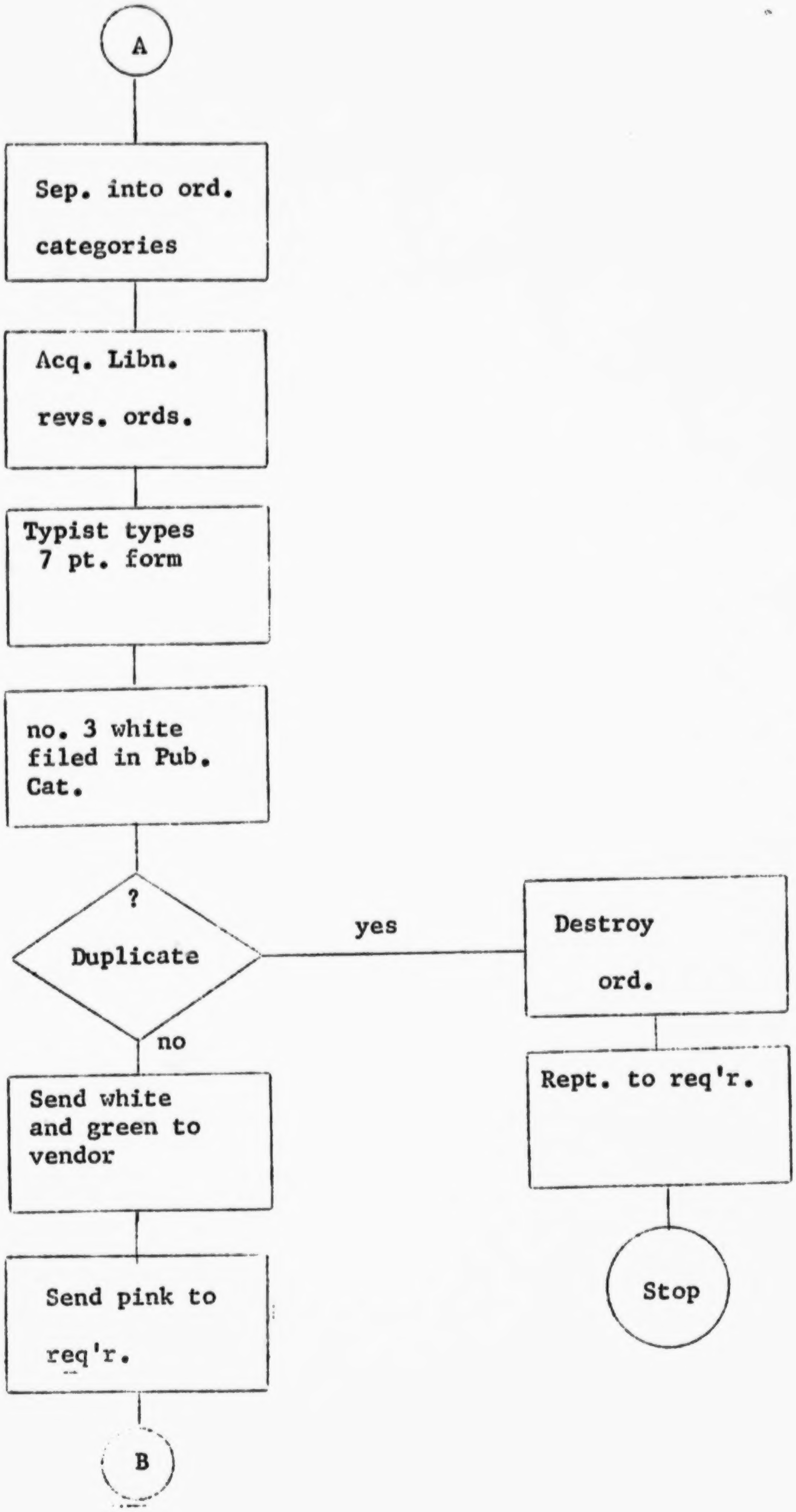
Library B--Catalog Department--Receiving LC Cards


Start
LC cds. or n.p. rept.
Pull pink ord. slip
? LC cds. rec'd.
yes
no
? Ord'd. by LC cd.#
no
yes
Sort by catr. indicated on pink slip
Note n.p. on pink ord. slip
Give cds.&pink ord.slip to catr. noted on pink slip
Match cds. with bks. on "wait" shelves
Match pink slips with bks.
Give bk. & LC cds. & pink ord. slip to catr.(by sbj.)
Give bk. & pink ord. slip to catr.(by sbj.)
File yell. ord. slip in LC cd. ords.completed file
File yell. ord. slips in LC cd. ords.completed
Stop
Stop

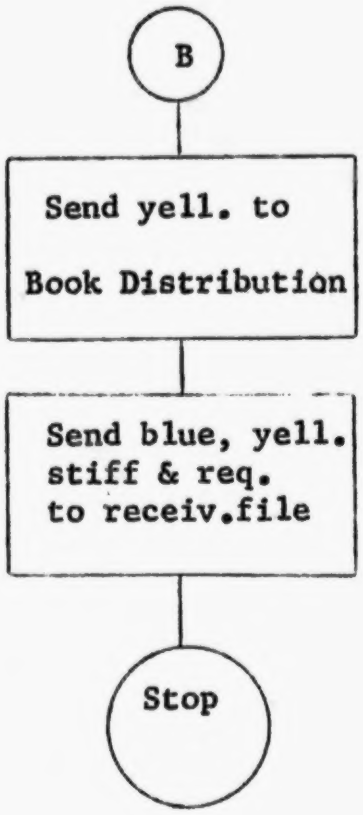
Library C--Acquisitions Department--Ordering


Start
Req.
Bib.Div. counts sorts & reviews req's.
Bib.Div. sends req's. to Acq. Dept.
Ck. for special handling (rush, res.)
Search Pub. Cat.
? Find
yes
Rept. to req'r.
Stop
no
Search LC Cats.
? Find
yes
Add LC cd. no. vol. & page
no
A

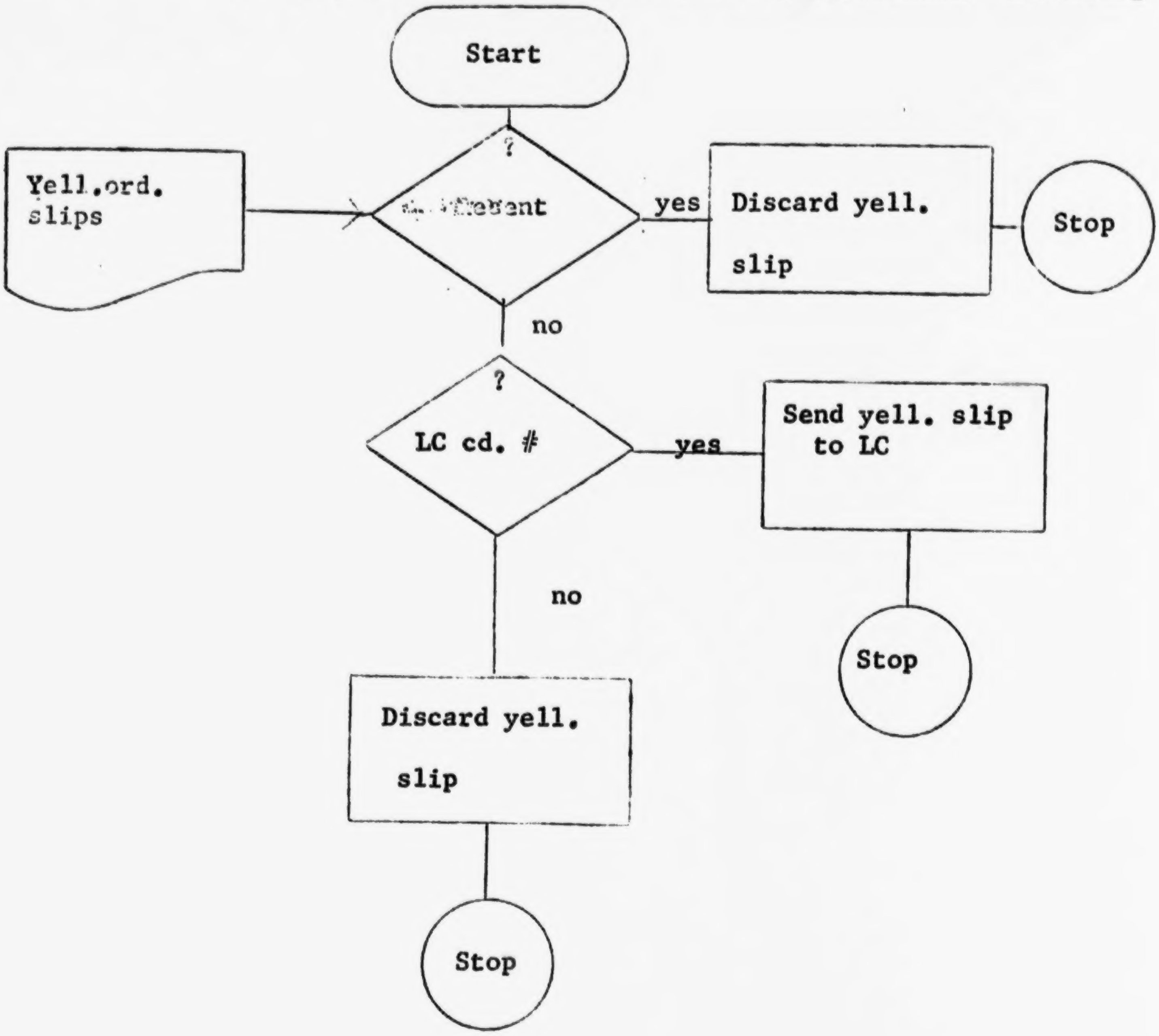
Library C--Acquisitions Department--Ordering


A
Sep. into ord. categories
Acq. Libn. revs. ords.
Typist types 7 pt. form
no. 3 white filed in Pub. Cat.
?
Duplicate
yes
no
Destroy ord.
Rept. to req'r.
Stop
Send white and green to vendor
Send pink to req'r.
B

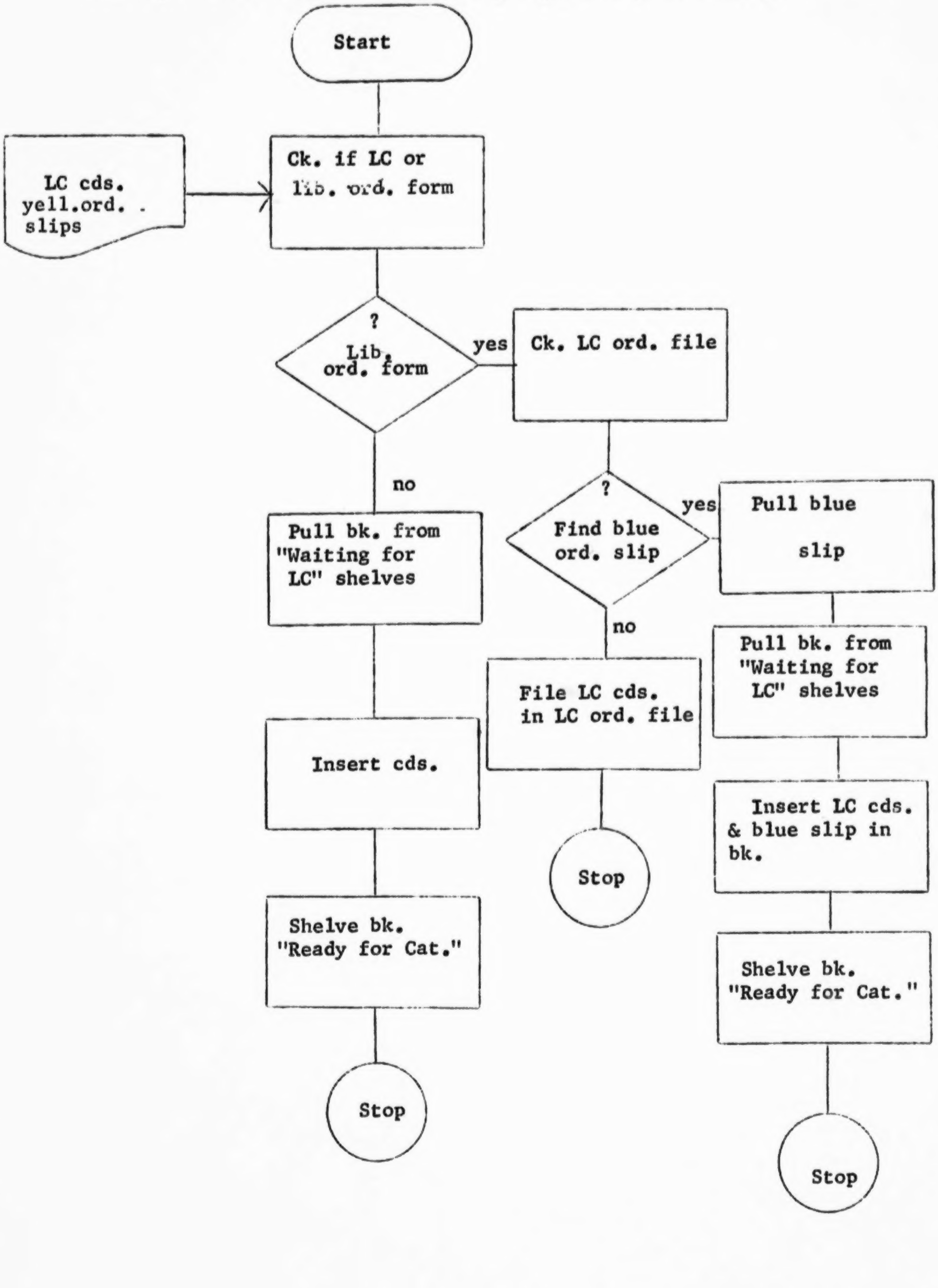
Library C--Acquisitions Department--Ordering


B
Send yell. to Book Distribution
Send blue, yell. stiff & req. to receiv.file
Stop

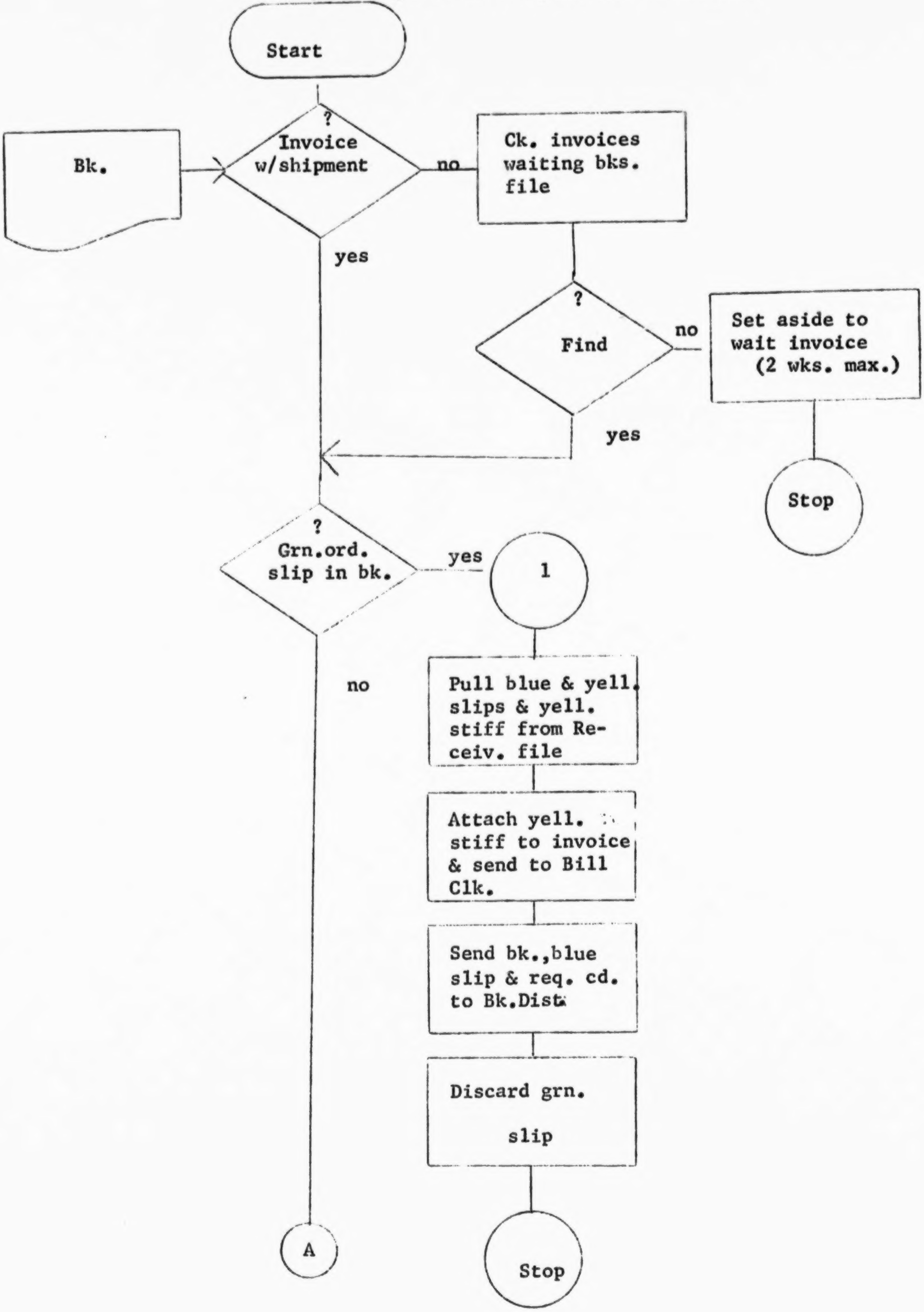
Library C--Book Distribution(Catalog Department)--Receiving


Start
Yell.ord.
slips
?
Different
yes
Discard yell.
slip
Stop
no
?
LC cd. #
yes
Send yell. slip
to LC
Stop
no
Discard yell.
slip
Stop

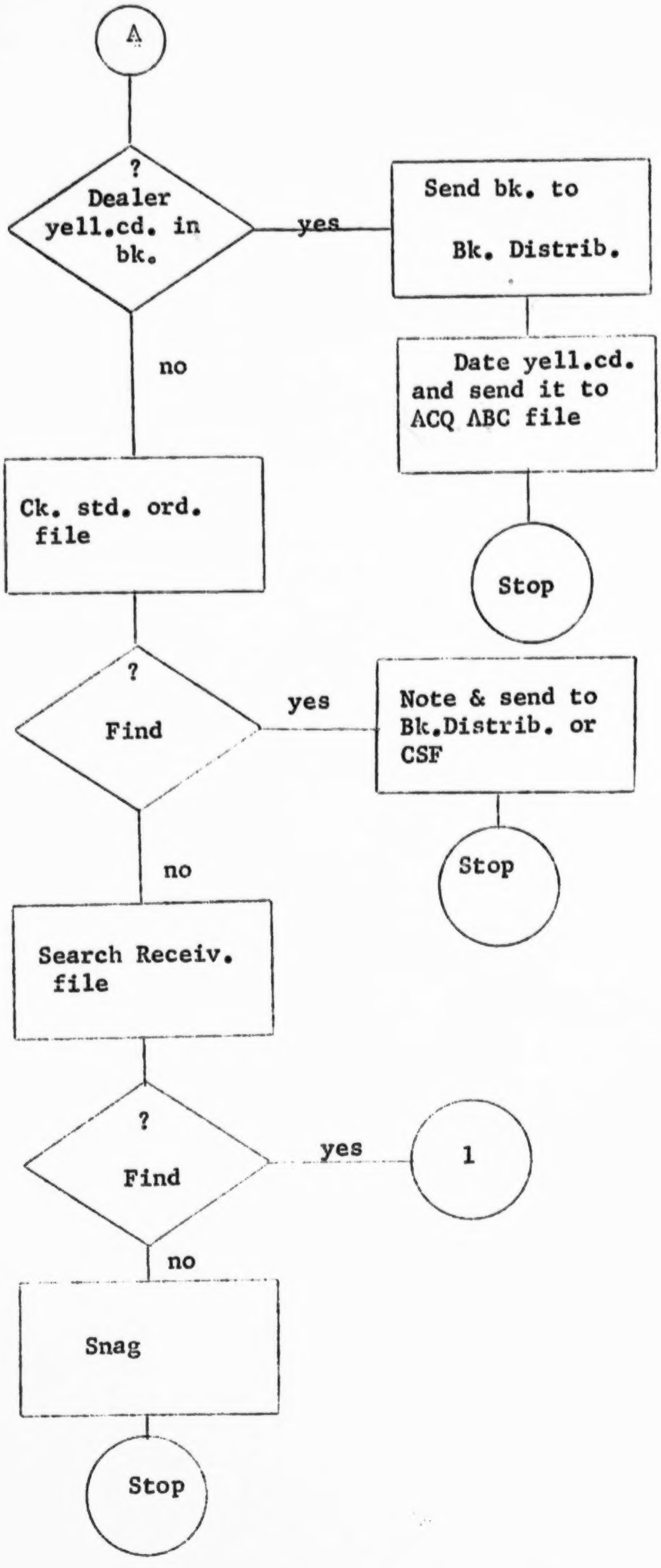
Library C--Book Distribution(Catalog Department)--Receiving


Start
LC cds. yell.ord. slips
Ck. if LC or lib. ord. form
? Lib. ord. form
yes
Ck. LC ord. file
no
Pull bk. from "Waiting for LC" shelves
? Find blue ord. slip
yes
Pull blue slip
no
File LC cds. in LC ord. file
Pull bk. from "Waiting for LC" shelves
Insert cds.
Insert LC cds. & blue slip in bk.
Stop
Shelve bk. "Ready for Cat."
Shelve bk. "Ready for Cat."
Stop
Stop

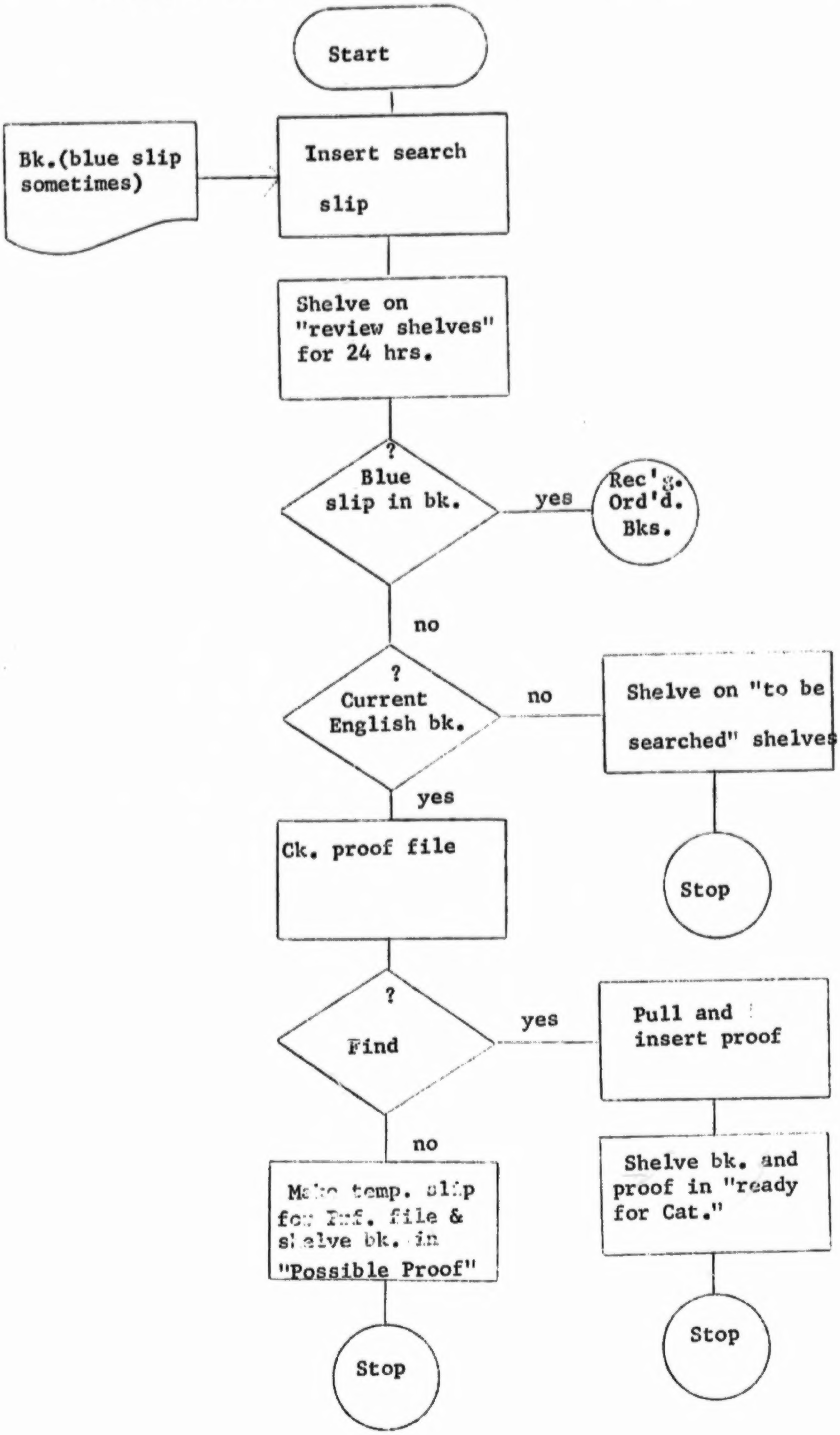
Library C--Acquisitions Department--Receiving


Start
Bk.
?
Invoice w/shipment
no
Ck. invoices waiting bks. file
yes
?
Find
no
Set aside to wait invoice (2 wks. max.)
yes
Stop
?
Grn.ord. slip in bk.
yes
1
no
Pull blue & yell. slips & yell. stiff from Receiv. file
Attach yell. stiff to invoice & send to Bill Clk.
Send bk.,blue slip & req. cd. to Bk.Dist.
Discard grn. slip
A
Stop

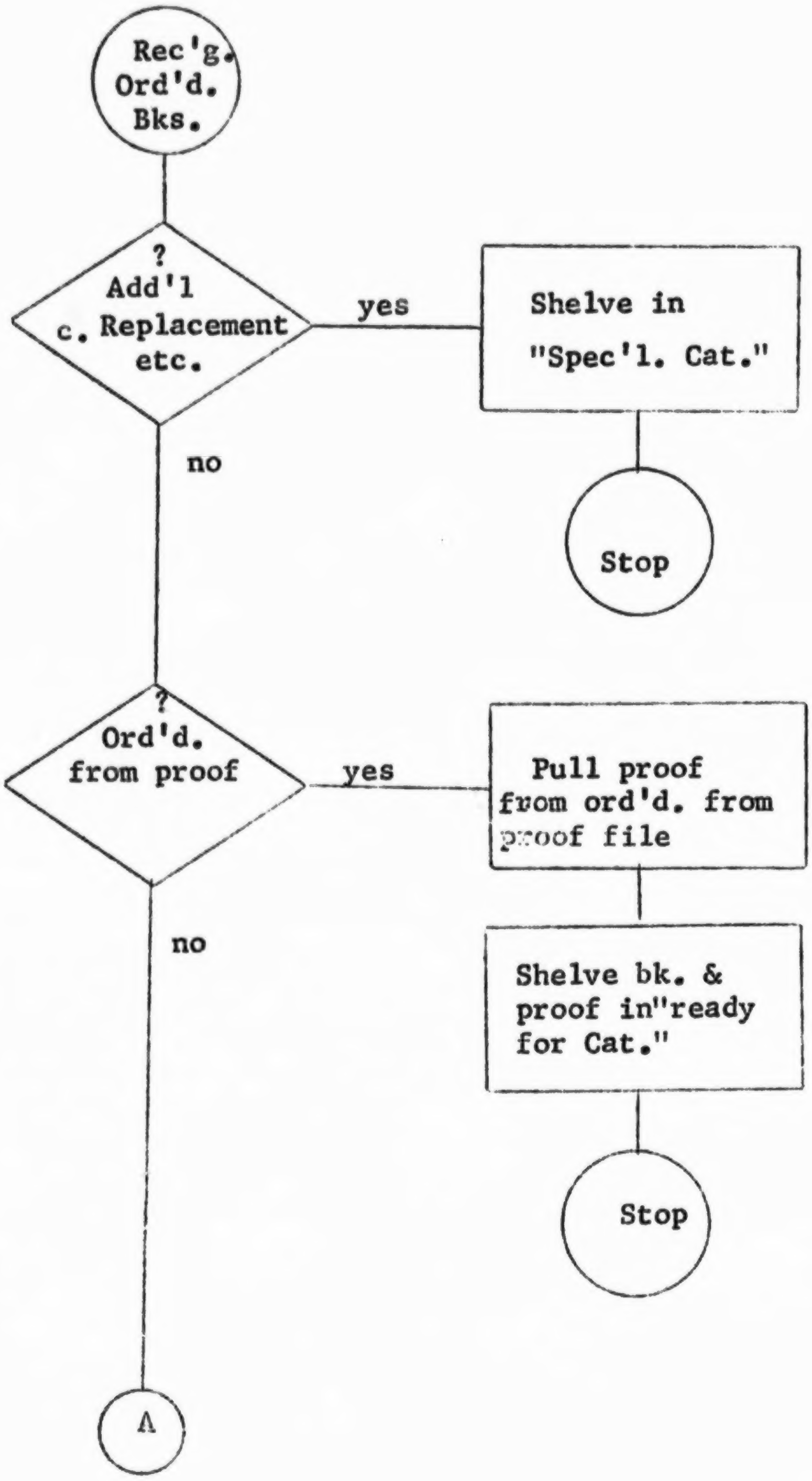
Library C--Acquisitions Department--Receiving


A
?
Dealer yell.cd. in bk.
yes
Send bk. to Bk. Distrib.
Date yell.cd. and send it to ACQ ABC file
Stop
no
Ck. std. ord. file
?
Find
yes
Note & send to Bk.Distrib. or CSF
Stop
no
Search Receiv. file
?
Find
yes
1
no
Snag
Stop

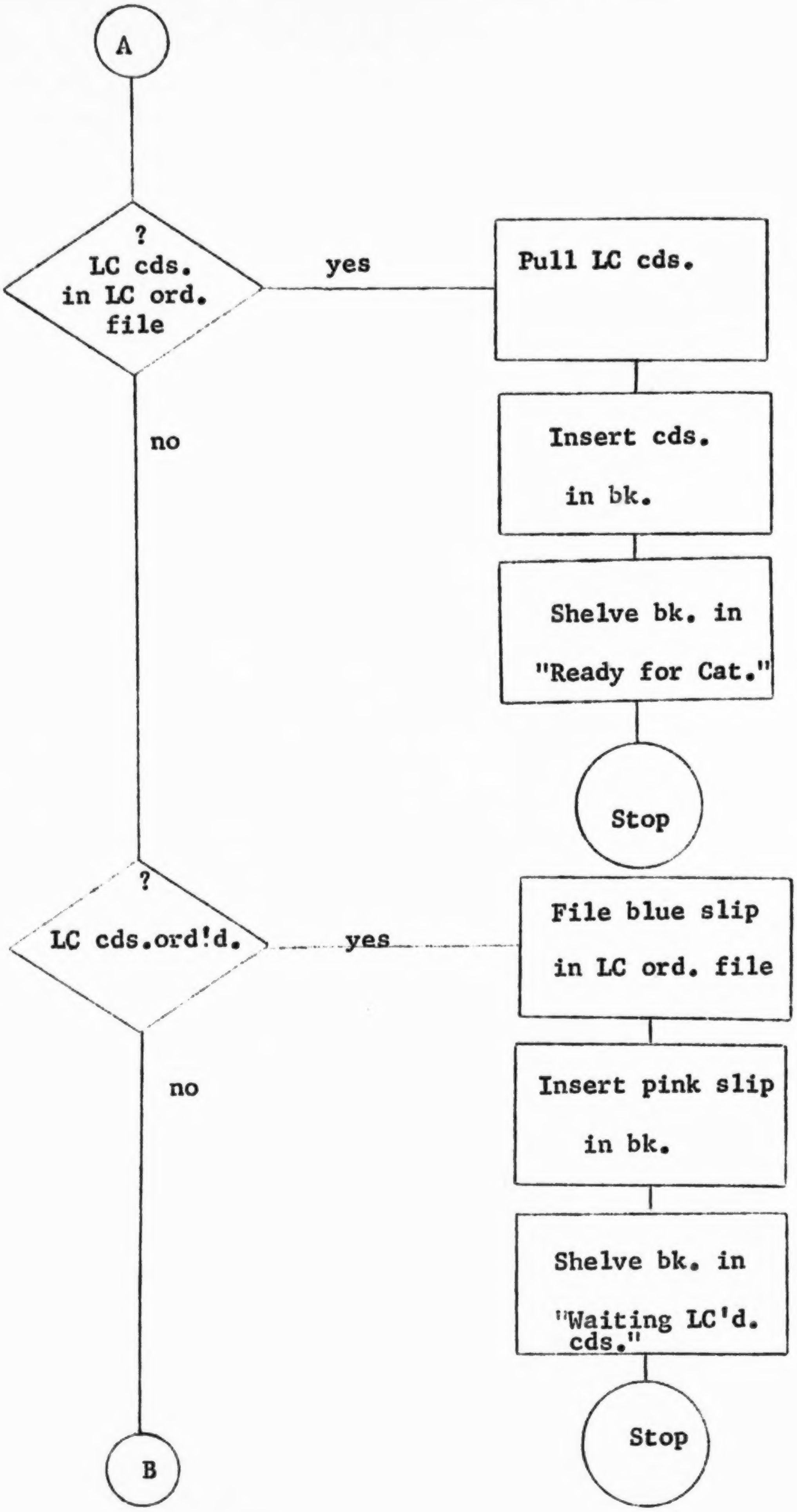
Library C--Book Distribution (Catalog Department)--Receiving


Start
Bk.(blue slip sometimes)
Insert search slip
Shelve on "review shelves" for 24 hrs.
? Blue slip in bk.
yes
Rec'g. Ord'd. Bks.
no
? Current English bk.
no
Shelve on "to be searched" shelves
Stop
yes
Ck. proof file
? Find
yes
Pull and insert proof
Shelve bk. and proof in "ready for Cat."
Stop
no
Make temp. slip for Prf. file & shelve bk. in "Possible Proof"
Stop

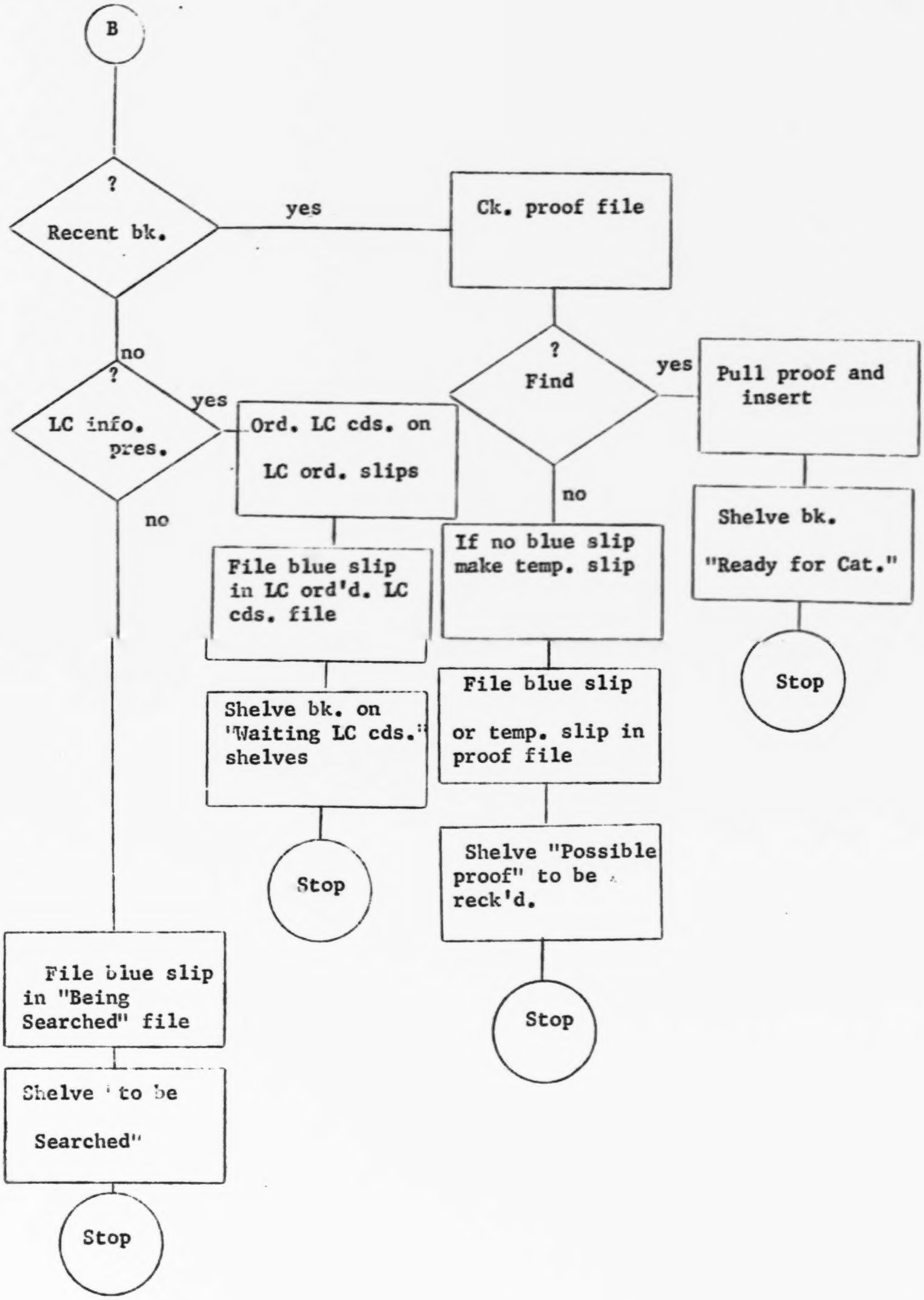
Library C--Book Distribution(Catalog Department)--Receiving


Rec'g.
Ord'd.
Bks.
?
Add'l
c. Replacement
etc.
yes
Shelve in
"Spec'l. Cat."
Stop
no
?
Ord'd.
from proof
yes
Pull proof
from ord'd. from
proof file
Shelve bk. &
proof in"ready
for Cat."
Stop
no
A

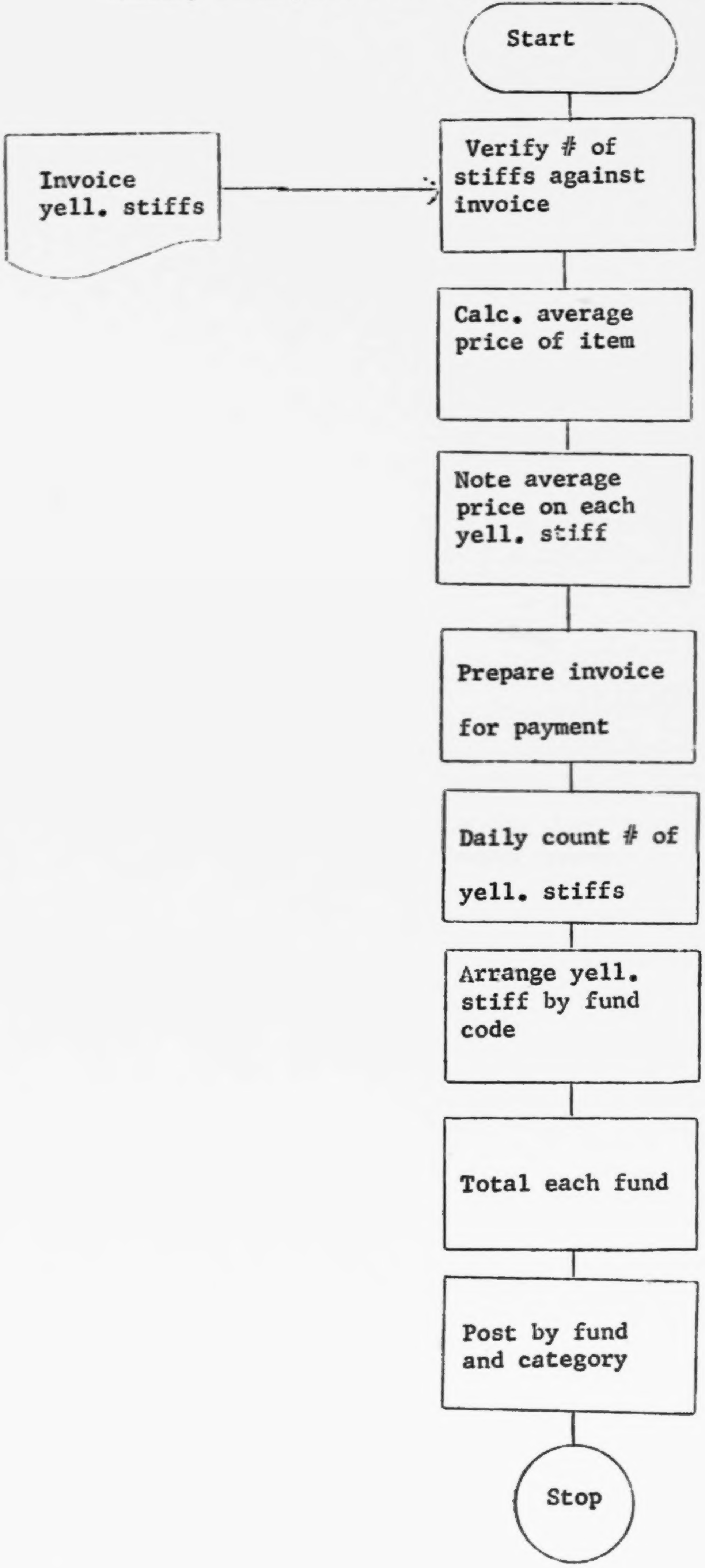
Library C--Book Distribution(Catalog Department)--Receiving


A
?
LC cds.
in LC ord.
file
yes
Pull LC cds.
Insert cds.
in bk.
Shelve bk. in
"Ready for Cat."
Stop
no
?
LC cds.ord'd.
yes
File blue slip
in LC ord. file
Insert pink slip
in bk.
Shelve bk. in
"Waiting LC'd. cds."
Stop
no
B

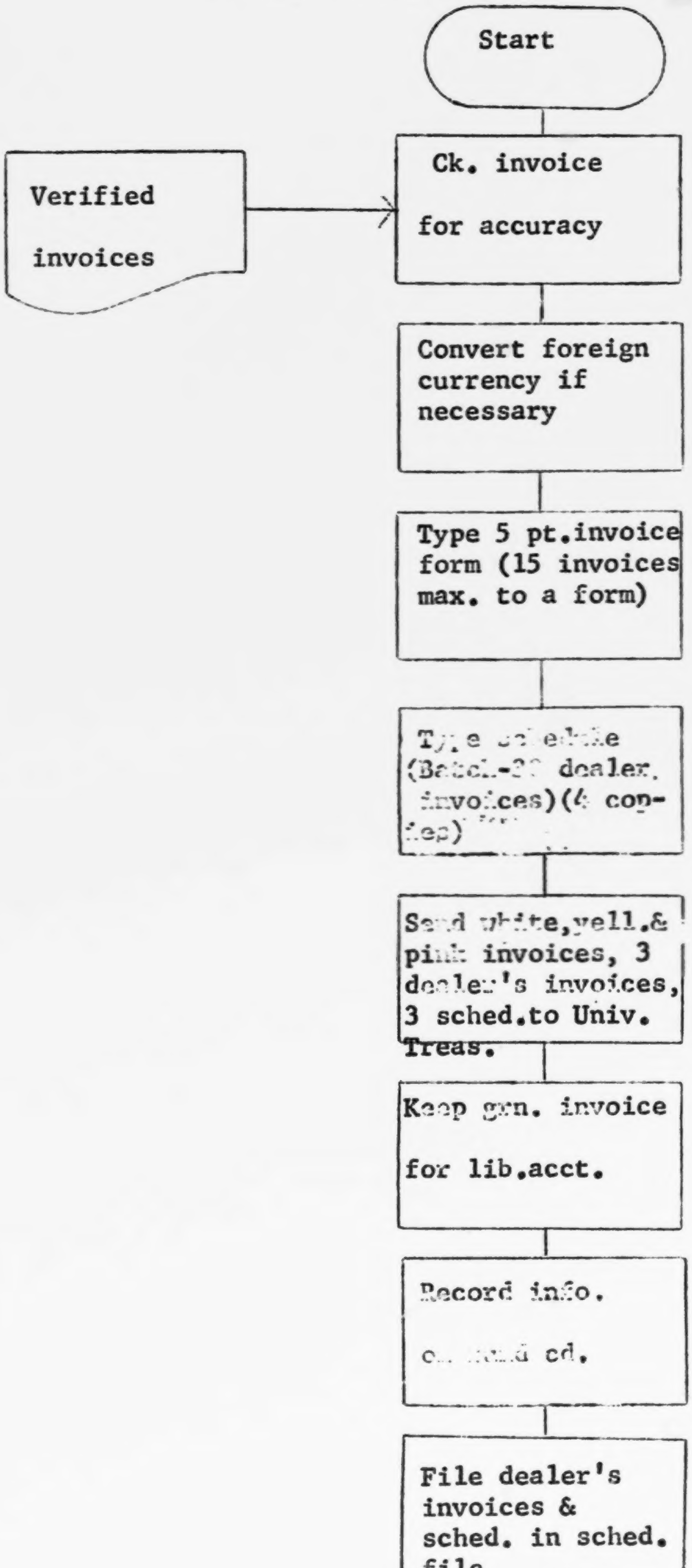
Library C--Book Distribution(Catalog Department)--Receiving


B
?
Recent bk.
yes
Ck. proof file
no
?
LC info. pres.
yes
Ord. LC cds. on LC ord. slips
?
Find
yes
Pull proof and insert
no
File blue slip in LC ord'd. LC cds. file
If no blue slip make temp. slip
Shelve bk. "Ready for Cat."
Stop
File blue slip or temp. slip in proof file
Shelve bk. on "Waiting LC cds." shelves
Stop
Shelve "Possible proof" to be reck'd.
Stop
File blue slip in "Being Searched" file
Shelve "to be Searched"
Stop

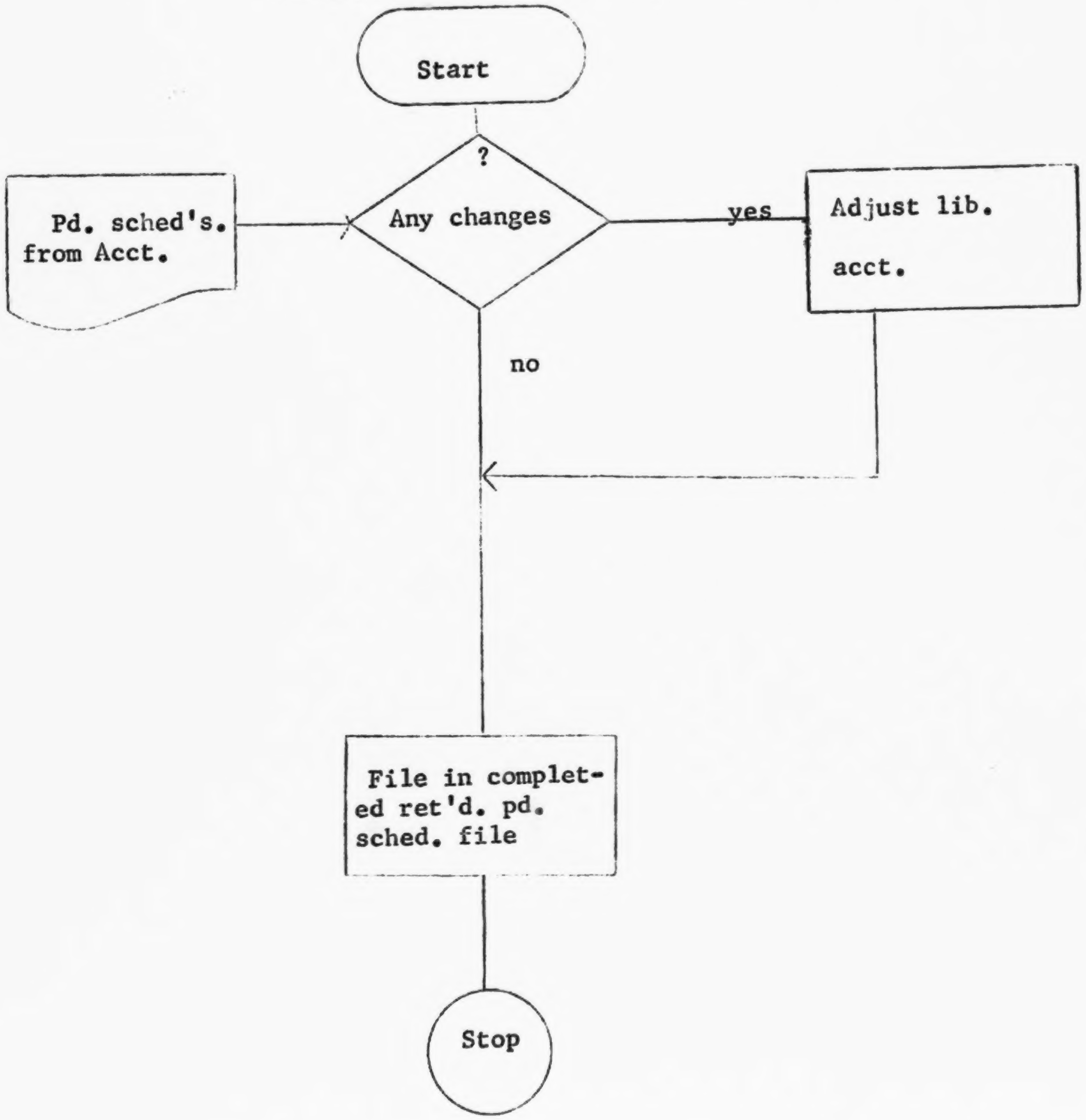
Library C--Acquisitions Department--Receiving


Start
Invoice yell. stiffs
Verify # of stiffs against invoice
Calc. average price of item
Note average price on each yell. stiff
Prepare invoice for payment
Daily count # of yell. stiffs
Arrange yell. stiff by fund code
Total each fund
Post by fund and category
Stop

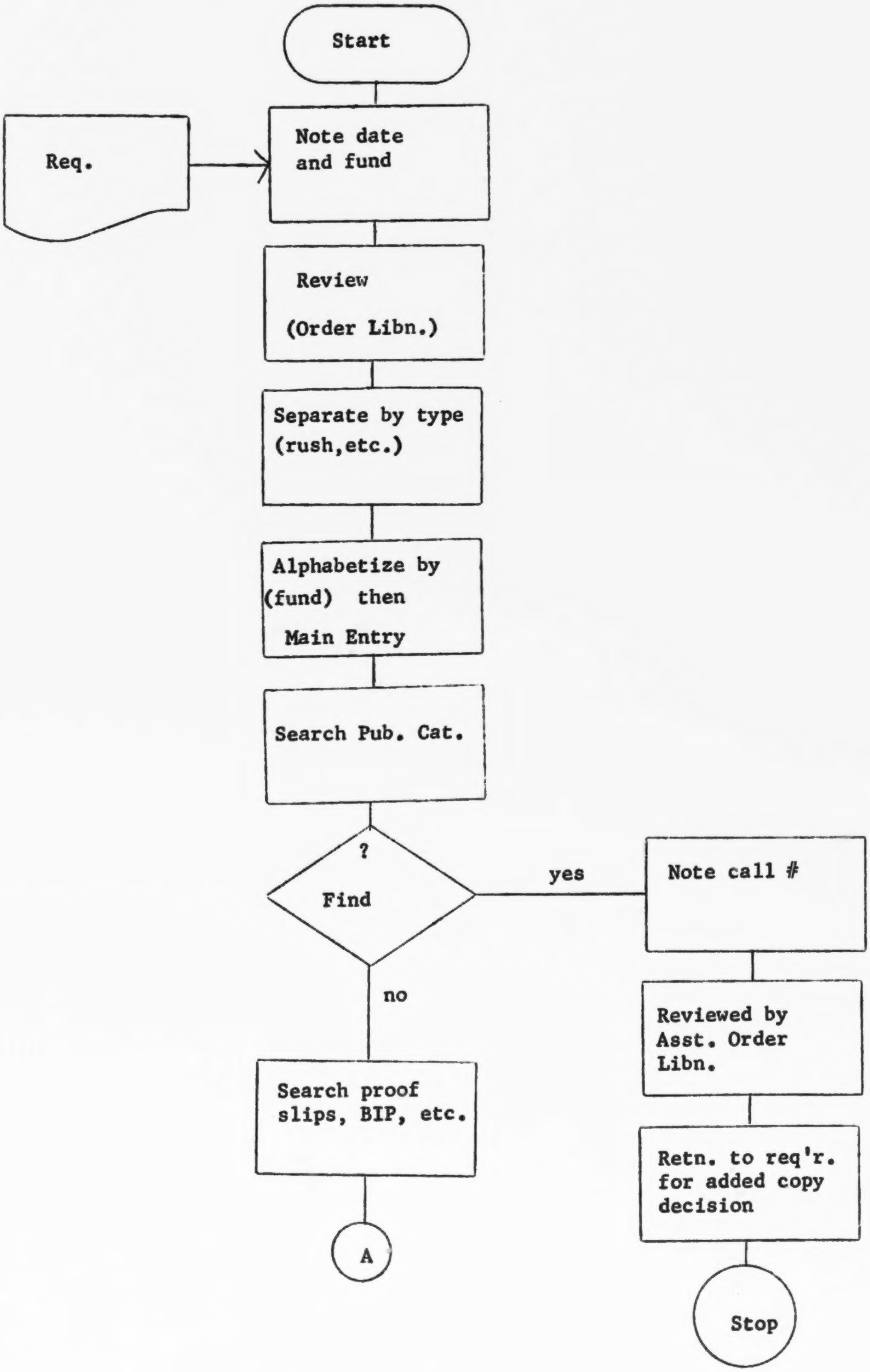
Library C--Acquisitions Department--Accounting


Start
Verified invoices
Ck. invoice for accuracy
Convert foreign currency if necessary
Type 5 pt. invoice form (15 invoices max. to a form)
Type schedule (Batch-2[illegible] dealer invoices)(4 copies)
Send white, yell.& pink invoices, 3 dealer's invoices, 3 sched. to Univ. Treas.
Keep grn. invoice for lib. acct.
Record info. on [illegible] cd.
File dealer's invoices & sched. in sched. file
Stop

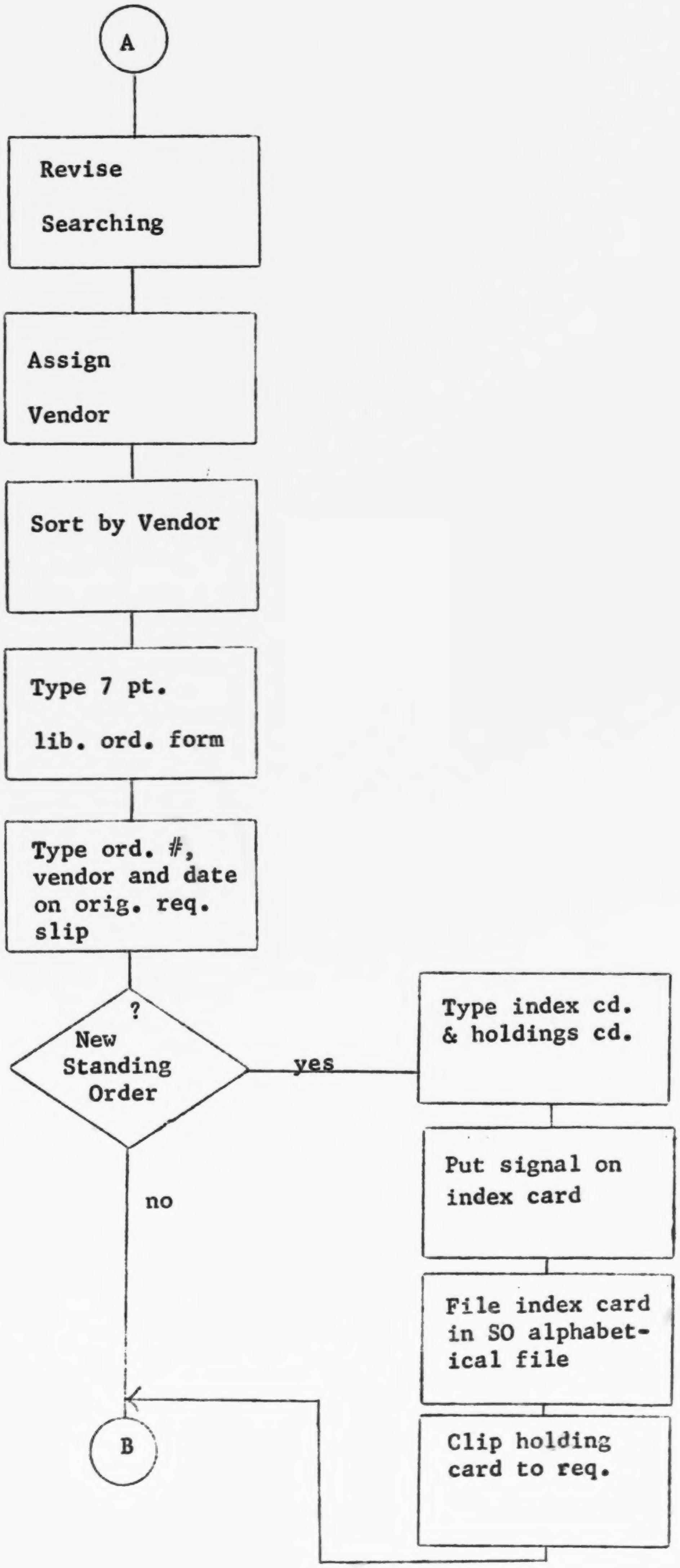
Library C--Acquisitions Department--Accounting


Start
Pd. sched's. from Acct.
?
Any changes
yes
Adjust lib. acct.
no
File in complet-ed ret'd. pd. sched. file
Stop

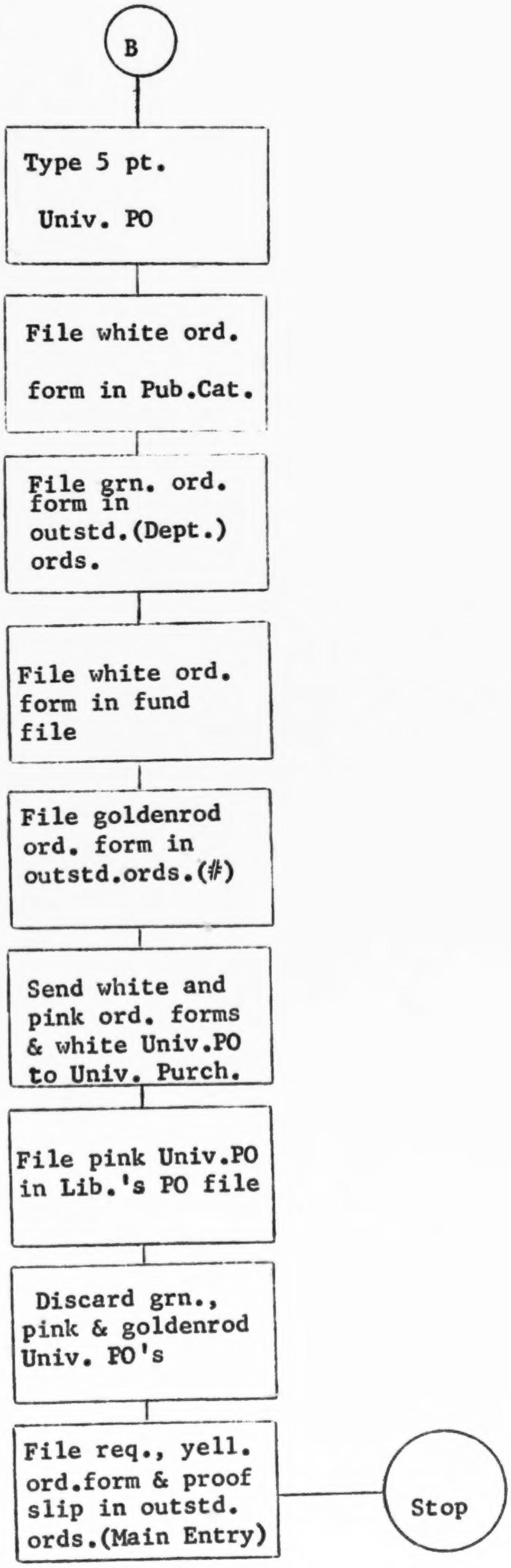
Library D--Acquisitions Department--Ordering


Start
Req.
Note date and fund
Review
(Order Libn.)
Separate by type (rush,etc.)
Alphabetize by (fund) then Main Entry
Search Pub. Cat.
?
Find
yes
no
Note call #
Reviewed by Asst. Order Libn.
Retn. to req'r. for added copy decision
Stop
Search proof slips, BIP, etc.
A

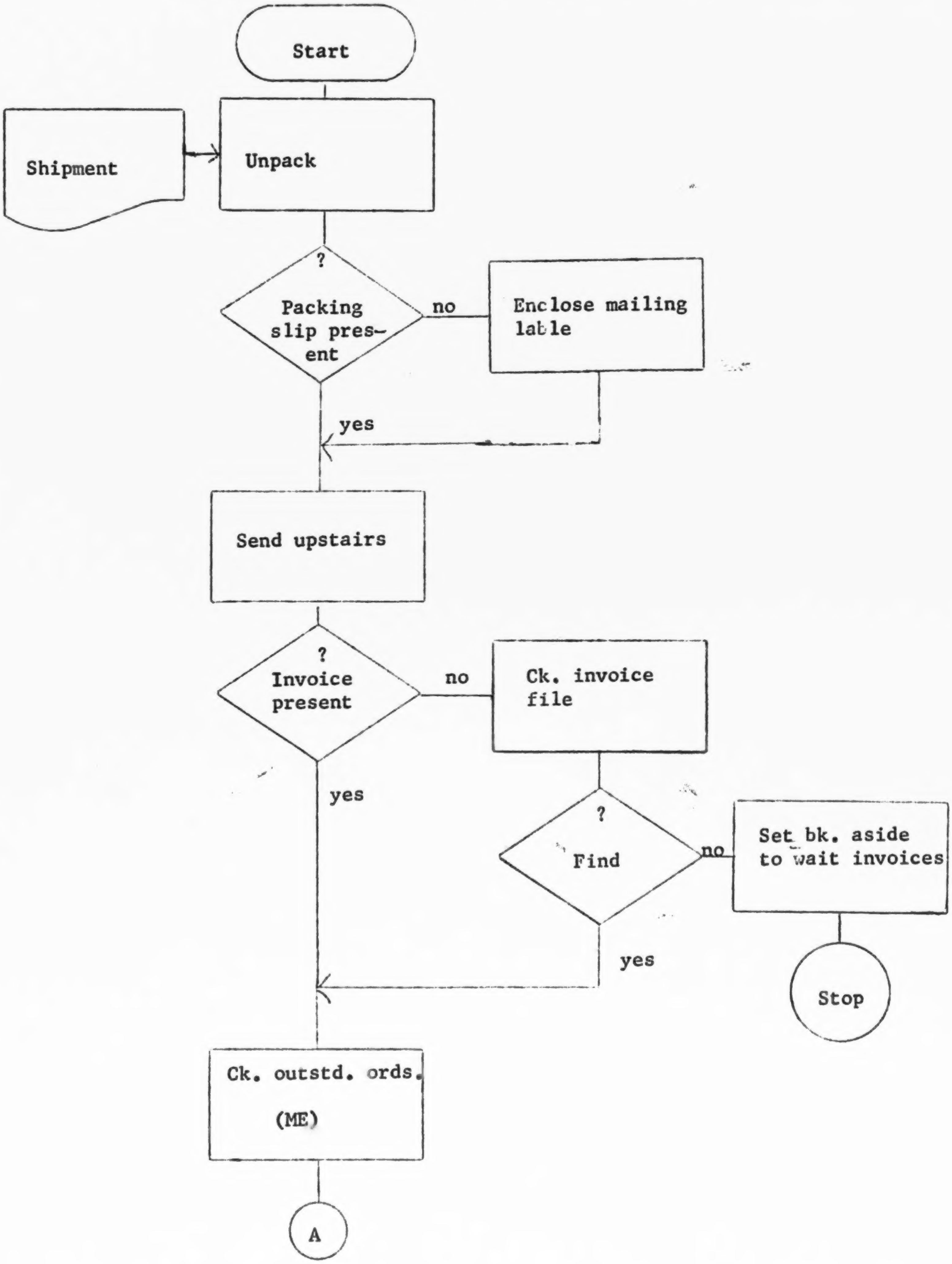
Library D--Acquisitions Department--Ordering


A
Revise Searching
Assign Vendor
Sort by Vendor
Type 7 pt. lib. ord. form
Type ord. #, vendor and date on orig. req. slip
? New Standing Order
yes
no
Type index cd. & holdings cd.
Put signal on index card
File index card in SO alphabetical file
Clip holding card to req.
B

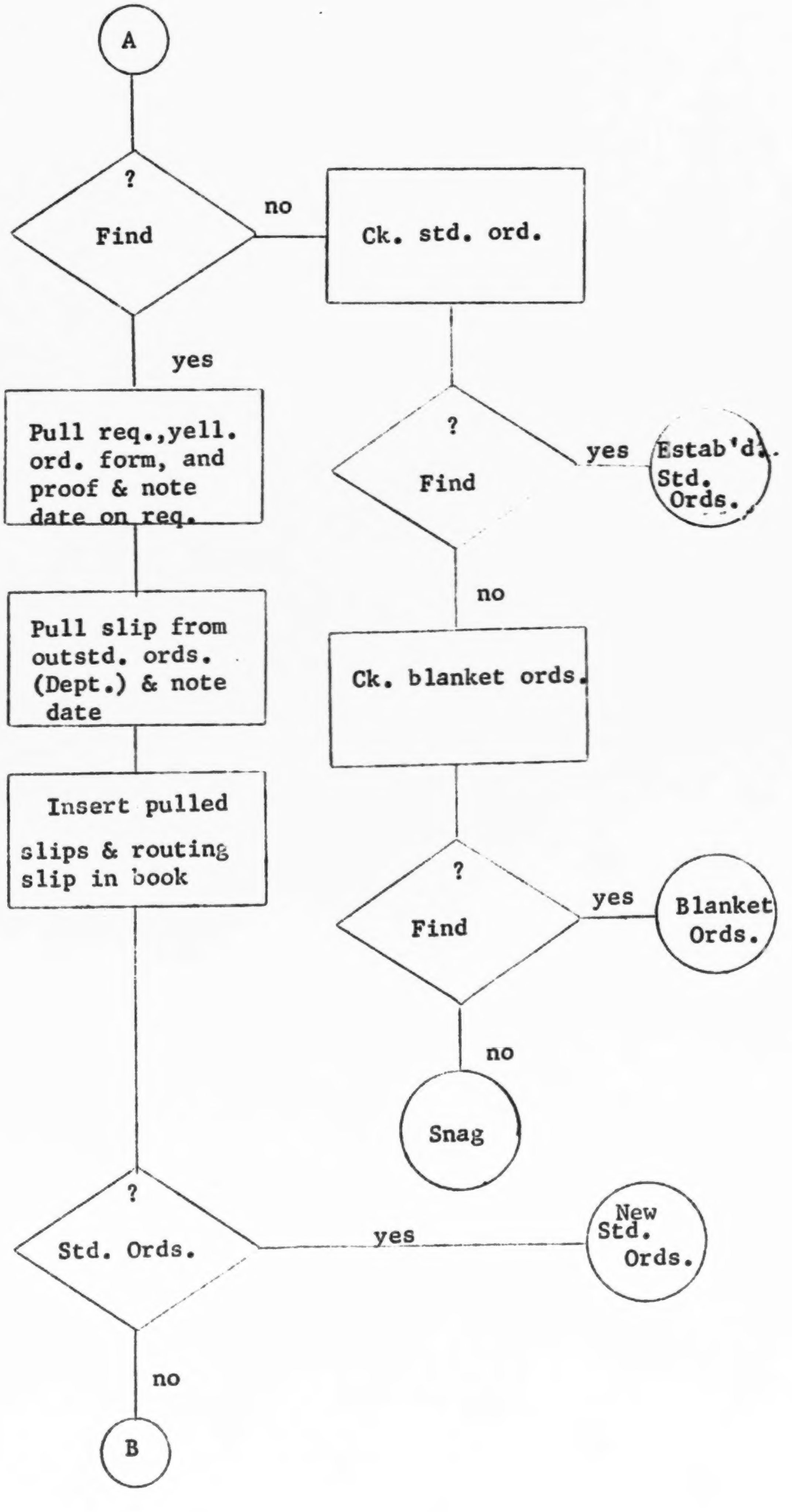
Library D--Acquisitions Department--Ordering


B
Type 5 pt. Univ. PO
File white ord. form in Pub.Cat.
File grn. ord. form in outstd.(Dept.) ords.
File white ord. form in fund file
File goldenrod ord. form in outstd.ords.(#)
Send white and pink ord. forms & white Univ.PO to Univ. Purch.
File pink Univ.PO in Lib.'s PO file
Discard grn., pink & goldenrod Univ. PO's
File req., yell. ord.form & proof slip in outstd. ords.(Main Entry)
Stop

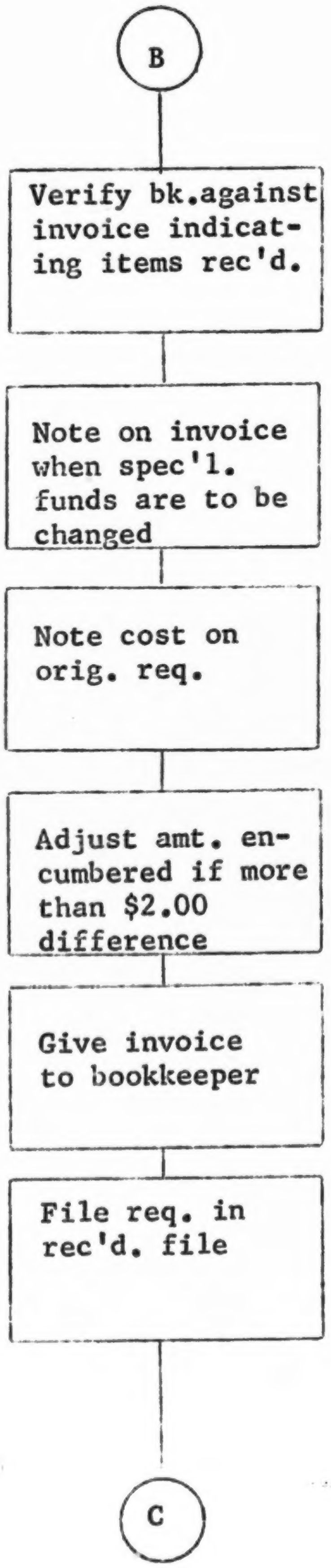
Library D--Acquisitions Department--Receiving


Start
Shipment
Unpack
?
Packing slip present
no
Enclose mailing lable
yes
Send upstairs
?
Invoice present
no
Ck. invoice file
yes
?
Find
no
Set bk. aside to wait invoices
Stop
yes
Ck. outstd. ords.
(ME)
A

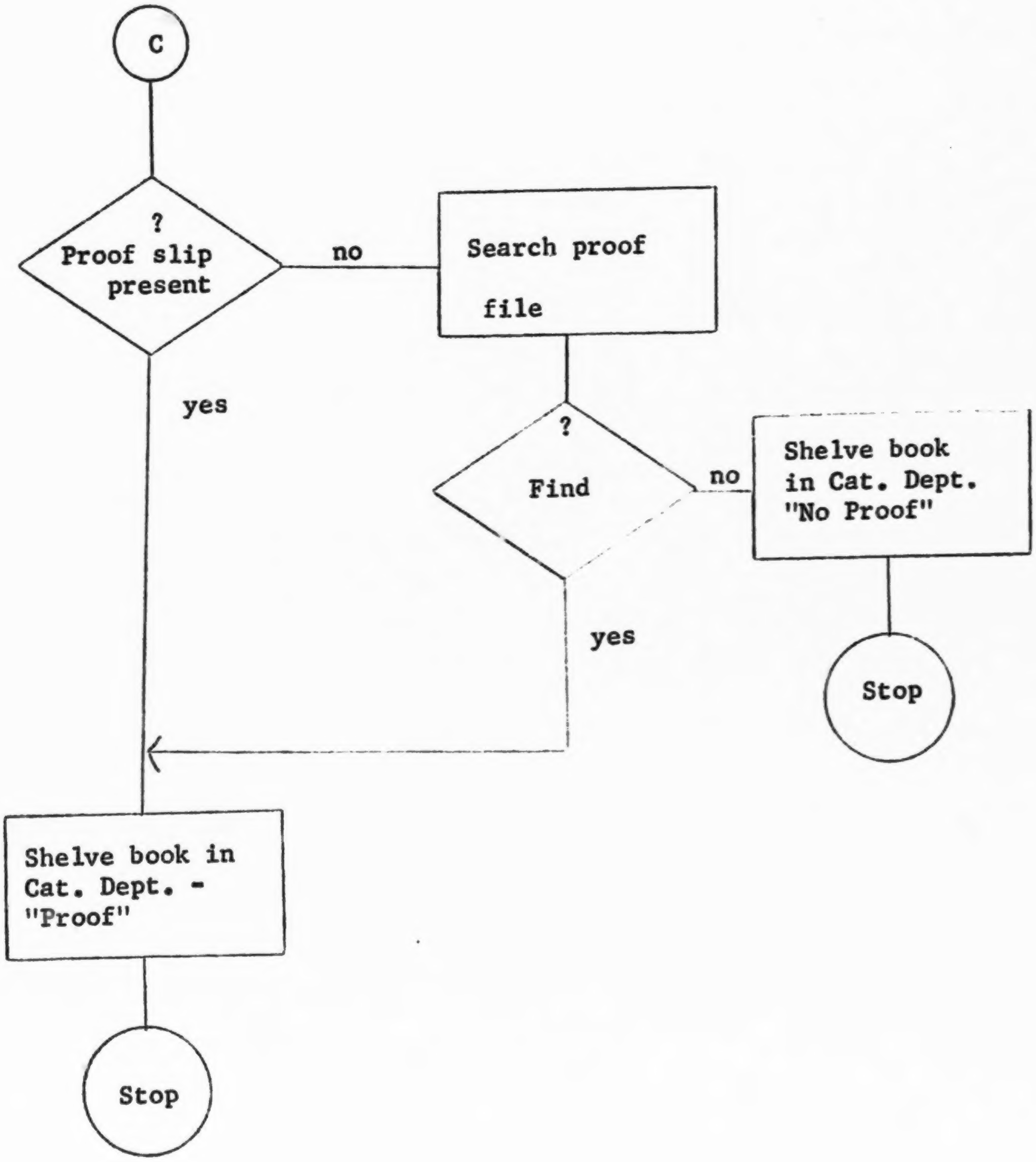
Library D--Acquisitions Department--Receiving


A
?
Find
no
Ck. std. ord.
yes
Pull req.,yell. ord. form, and proof & note date on req.
?
Find
yes
Estab'd. Std. Ords.
no
Pull slip from outstd. ords. (Dept.) & note date
Ck. blanket ords.
Insert pulled slips & routing slip in book
?
Find
yes
Blanket Ords.
no
Snag
?
Std. Ords.
yes
New Std. Ords.
no
B

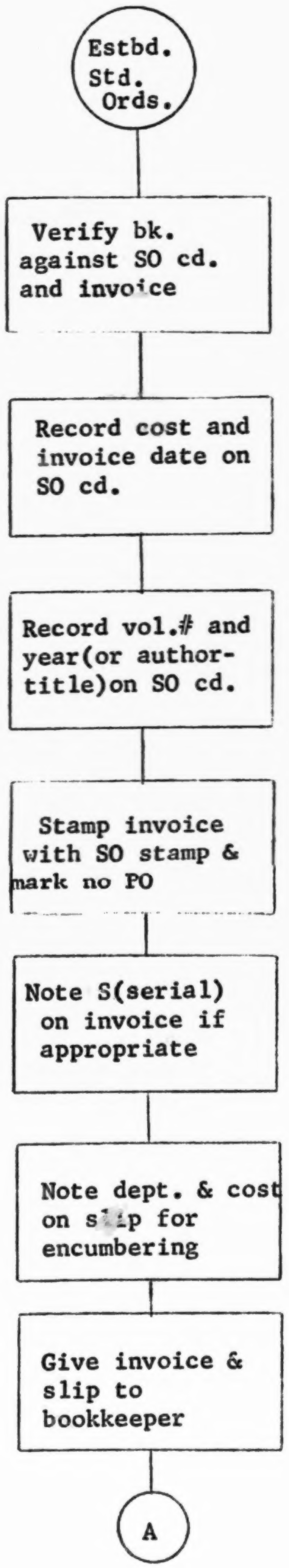
Library D--Acquisitions Department--Receving


B
Verify bk.against invoice indicating items rec'd.
Note on invoice when spec'l. funds are to be changed
Note cost on orig. req.
Adjust amt. encumbered if more than $2.00 difference
Give invoice to bookkeeper
File req. in rec'd. file
C

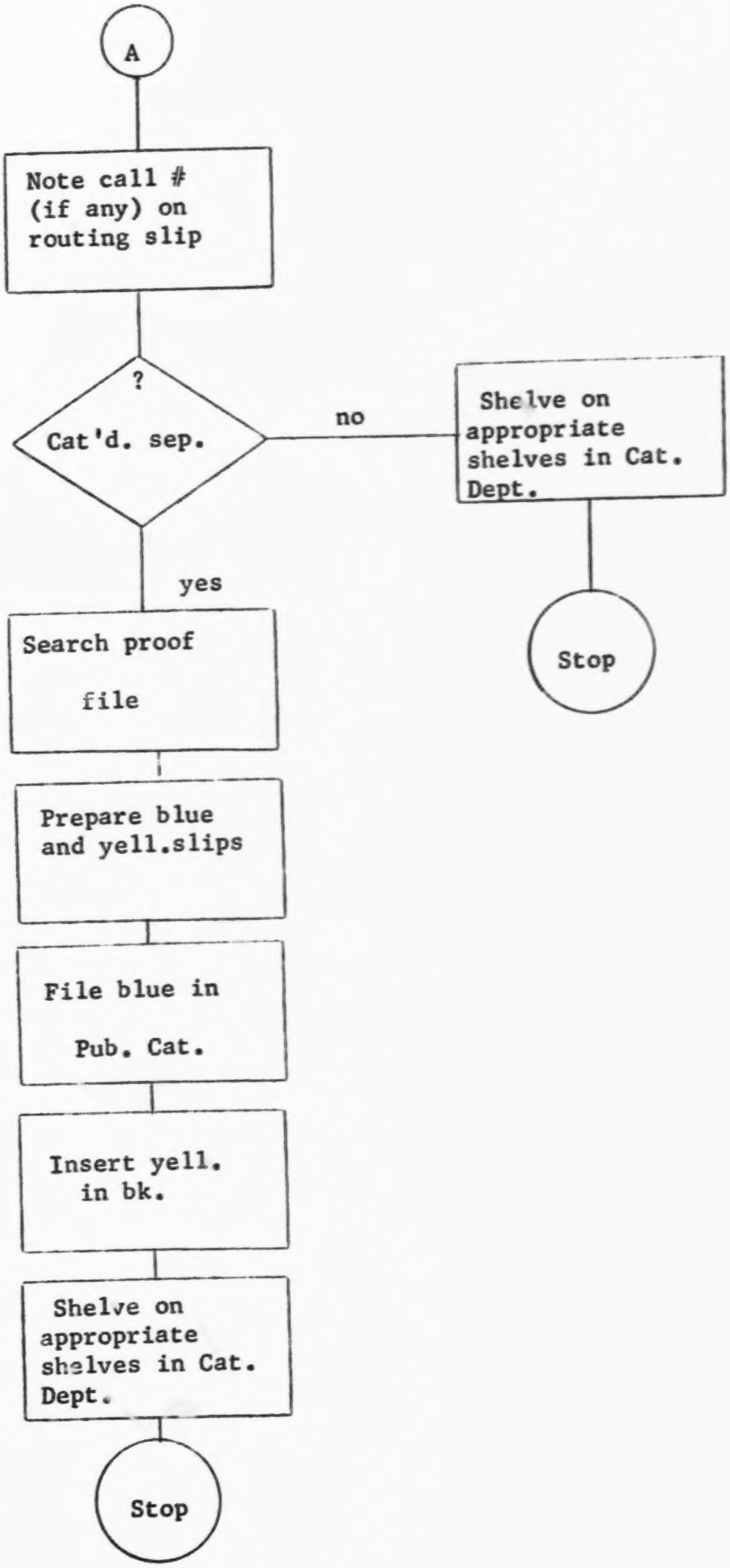
Library D--Acquisitions Department--Receiving


C
?
Proof slip
present
no
Search proof
file
yes
?
Find
no
Shelve book
in Cat. Dept.
"No Proof"
yes
Stop
Shelve book in
Cat. Dept. -
"Proof"
Stop

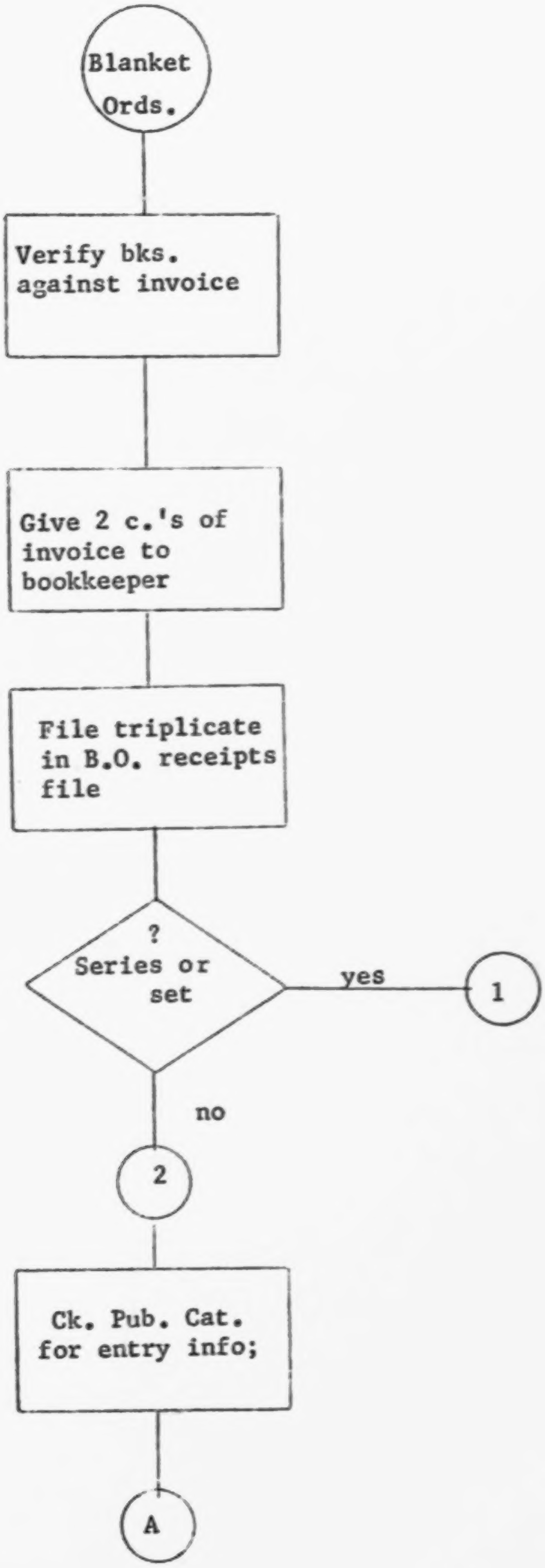
Library D--Acquisitions Department--Receiving Established Standing Orders


Estbd. Std. Ords.
Verify bk. against SO cd. and invoice
Record cost and invoice date on SO cd.
Record vol.# and year(or author-title)on SO cd.
Stamp invoice with SO stamp & mark no PO
Note S(serial) on invoice if appropriate
Note dept. & cost on slip for encumbering
Give invoice & slip to bookkeeper
A

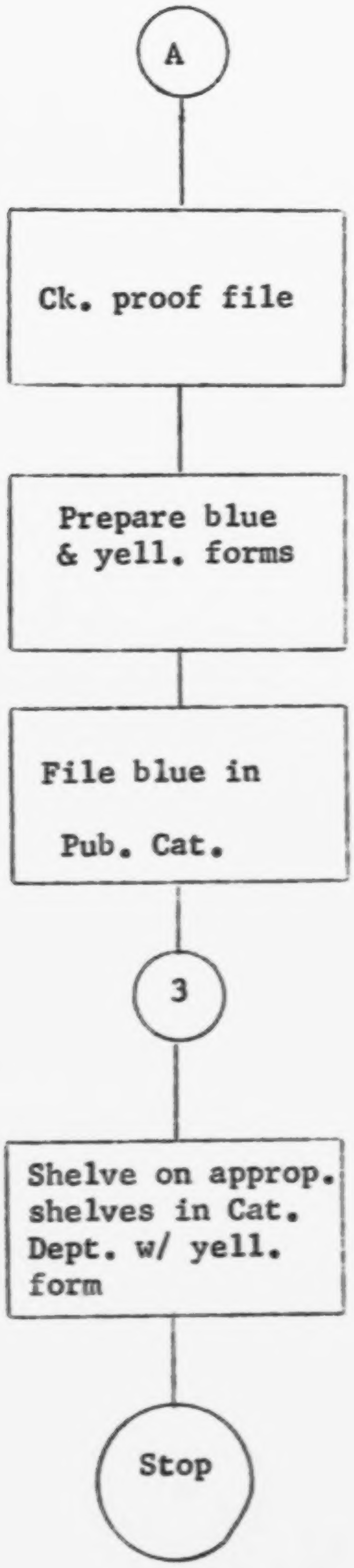
Library D--Acquisitions Department--Receiving Established Standing Orders


A
Note call # (if any) on routing slip
?
Cat'd. sep.
no
Shelve on appropriate shelves in Cat. Dept.
Stop
yes
Search proof file
Prepare blue and yell.slips
File blue in Pub. Cat.
Insert yell. in bk.
Shelve on appropriate shelves in Cat. Dept.
Stop

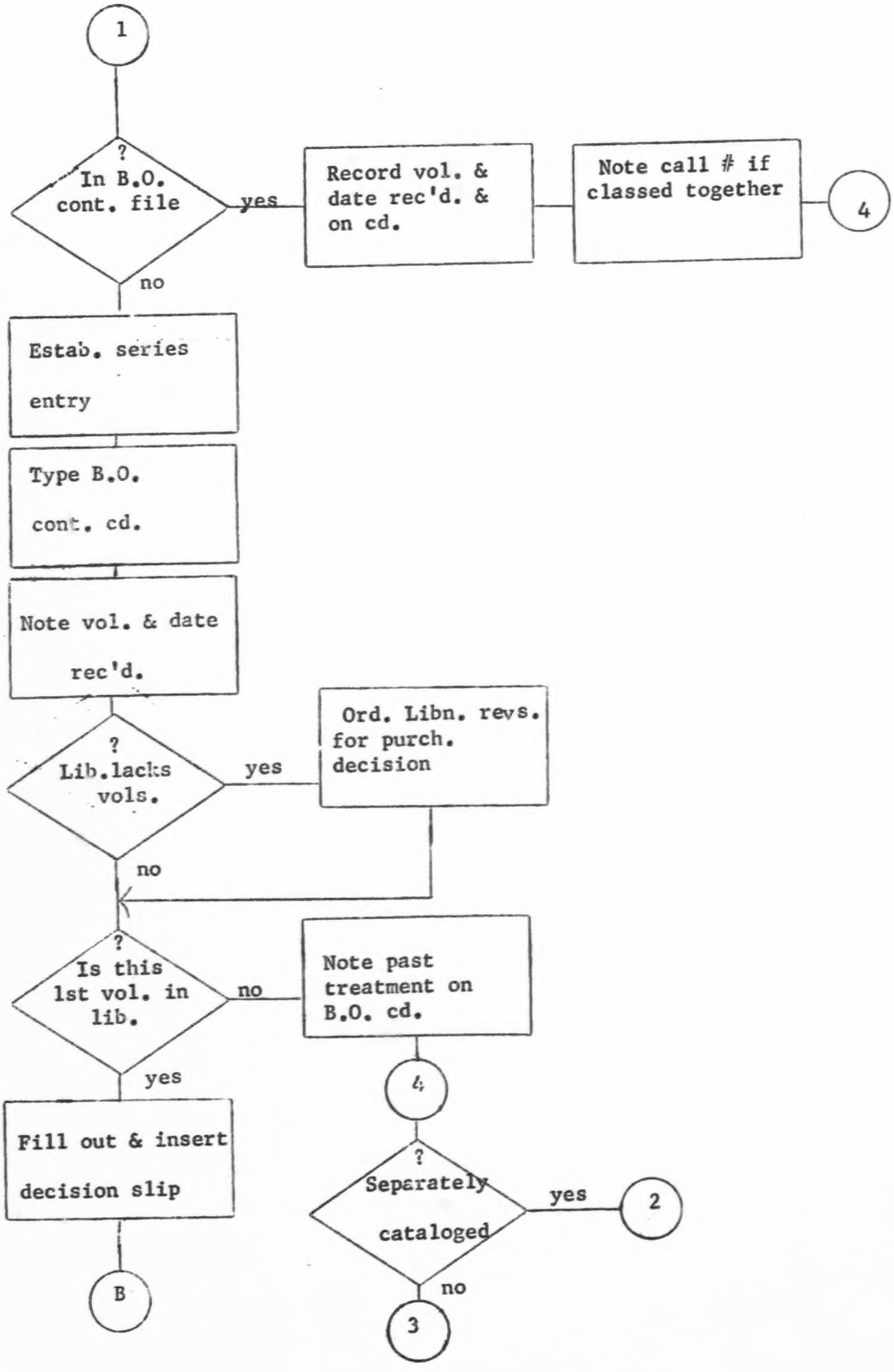
Library D--Acquisitions Department--Receiving Blanket Orders


Blanket Ords.
Verify bks. against invoice
Give 2 c.'s of invoice to bookkeeper
File triplicate in B.O. receipts file
? Series or set
yes
1
no
2
Ck. Pub. Cat. for entry info;
A

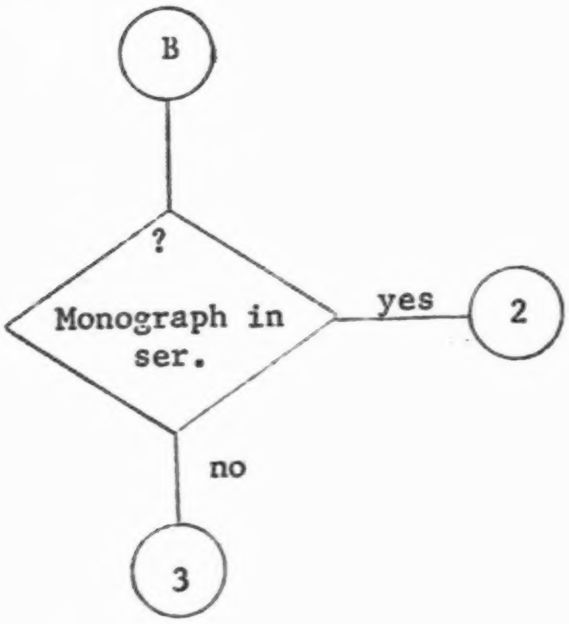
Library D--Acquisitions Department--Receiving Blanket Orders


A
Ck. proof file
Prepare blue & yell. forms
File blue in Pub. Cat.
3
Shelve on approp. shelves in Cat. Dept. w/ yell. form
Stop

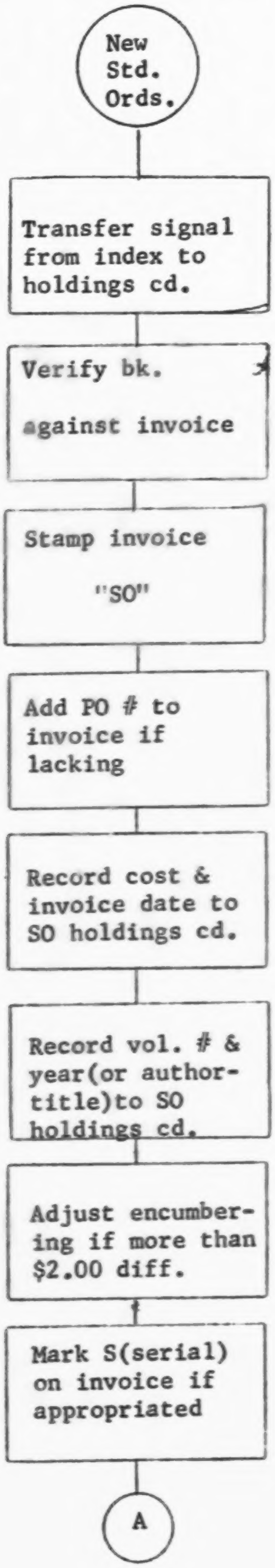
Library D--Acquisitions Department--Receiving Blanket Orders


1
?
In B.O.
cont. file
yes
no
Record vol. &
date rec'd. &
on cd.
Note call # if
classed together
4
Estab. series
entry
Type B.O.
cont. cd.
Note vol. & date
rec'd.
?
Lib. lacks
vols.
yes
no
Ord. Libn. revs.
for purch.
decision
?
Is this
1st vol. in
lib.
no
yes
Note past
treatment on
B.O. cd.
4
Fill out & insert
decision slip
B
?
Separately
cataloged
yes
no
2
3

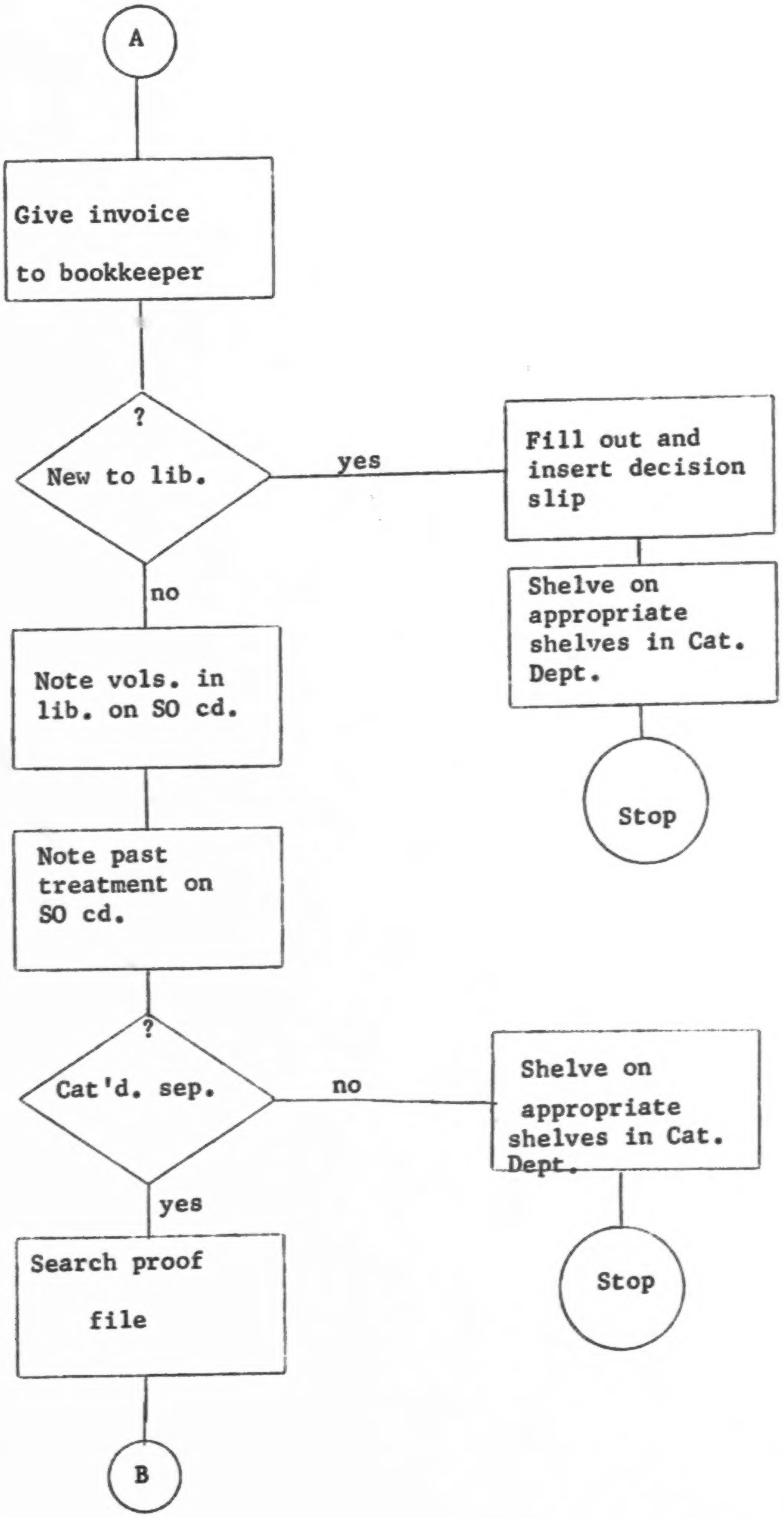
Library D--Acquisitions Department--Receiving Blanket Orders


B
?
Monograph in ser.
yes
2
no
3

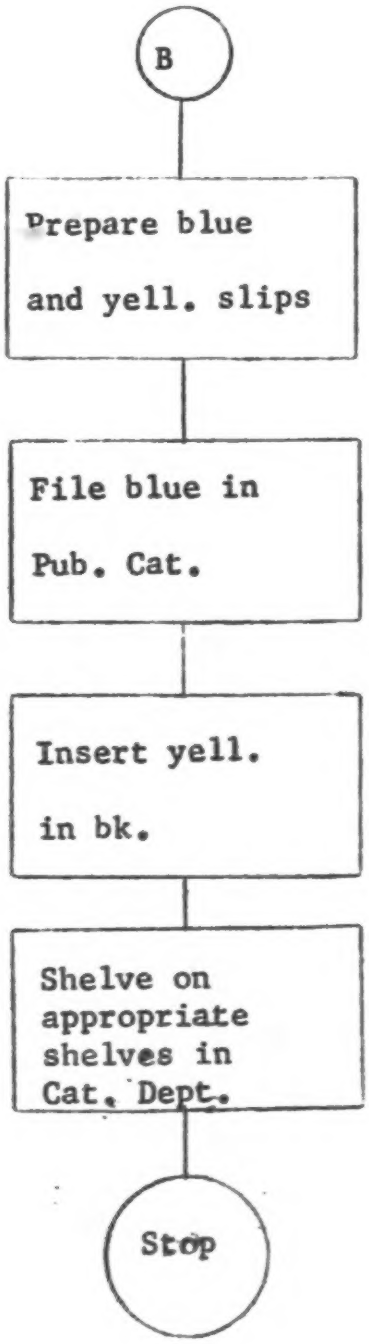
Library D--Acquisitions Department--Receiving New Standing Orders


New Std. Ords.
Transfer signal from index to holdings cd.
Verify bk. against invoice
Stamp invoice "SO"
Add PO # to invoice if lacking
Record cost & invoice date to SO holdings cd.
Record vol. # & year(or author-title)to SO holdings cd.
Adjust encumbering if more than $2.00 diff.
Mark S(serial) on invoice if appropriated
A

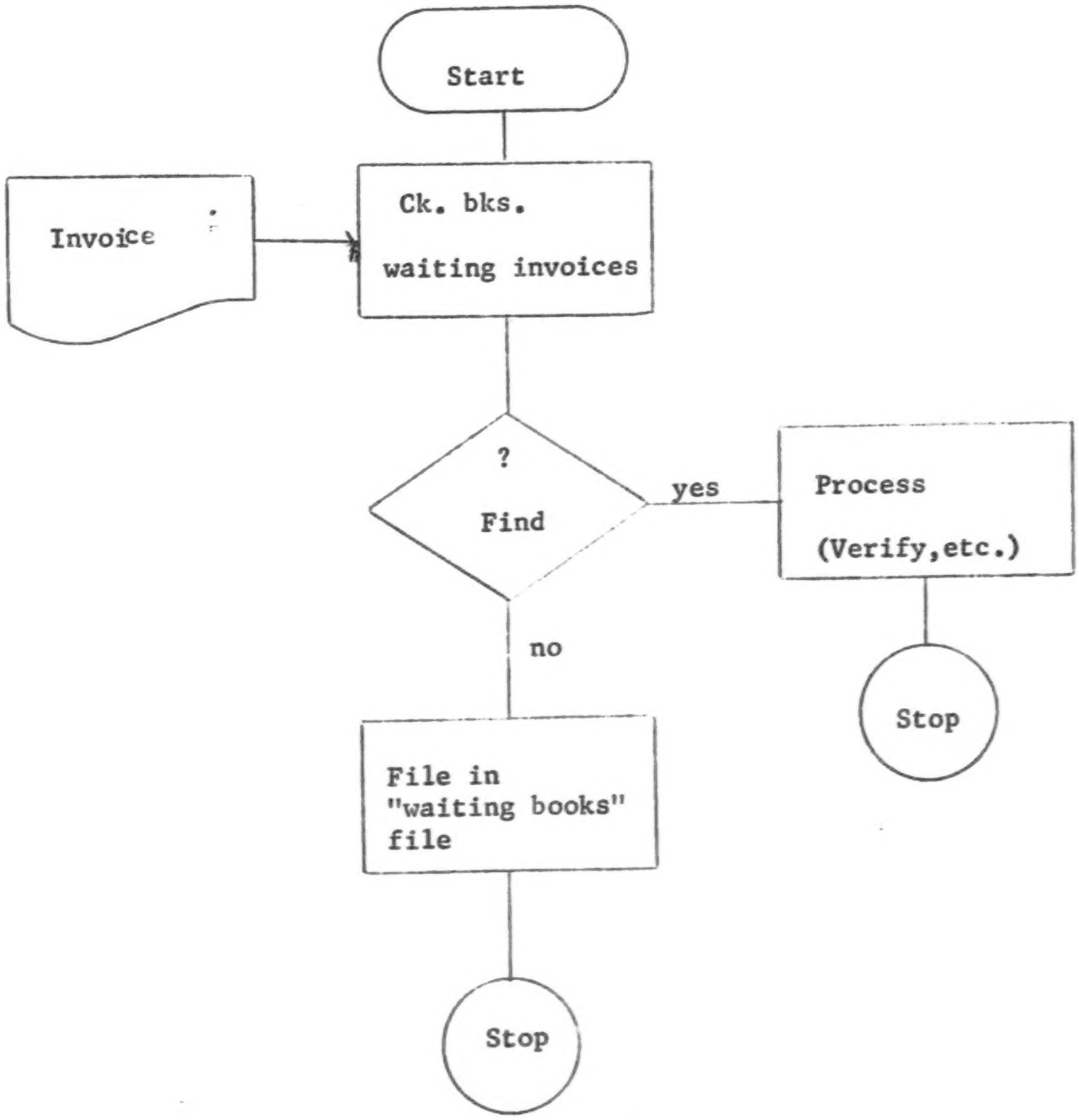
Library D--Acquisitions Department--Receiving New Standing Orders


A
Give invoice to bookkeeper
?
New to lib.
yes
Fill out and insert decision slip
Shelve on appropriate shelves in Cat. Dept.
Stop
no
Note vols. in lib. on SO cd.
Note past treatment on SO cd.
?
Cat'd. sep.
no
Shelve on appropriate shelves in Cat. Dept.
Stop
yes
Search proof file
B

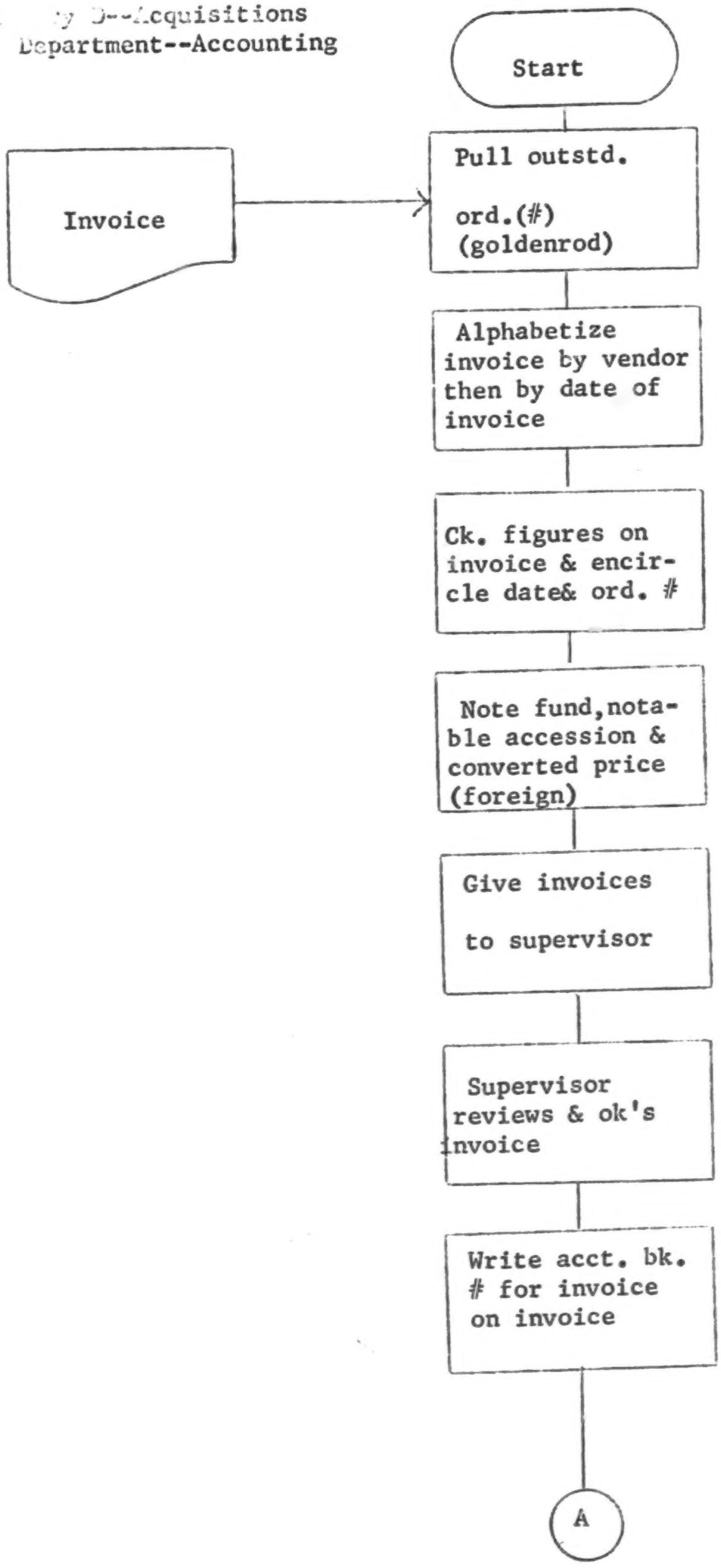
Library D--Acquisitions Department--Receiving New Standing Orders


B
Prepare blue and yell. slips
File blue in Pub. Cat.
Insert yell. in bk.
Shelve on appropriate shelves in Cat. Dept.
Stop

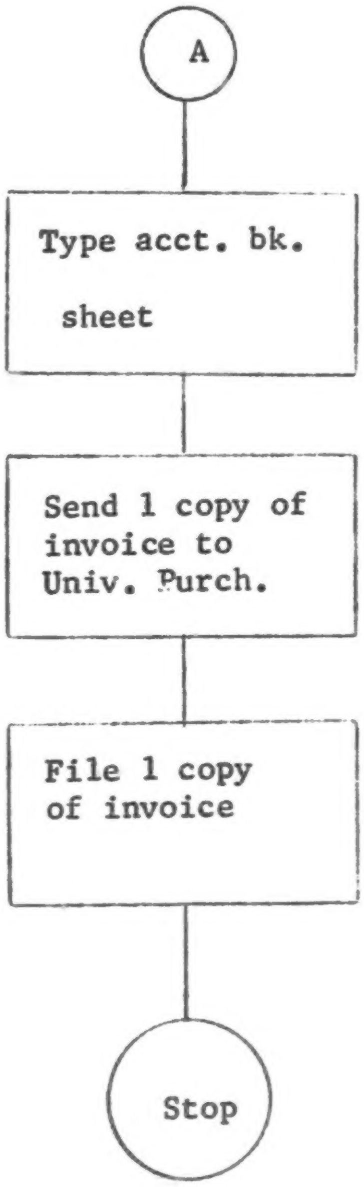
Library D--Acquisitions Department--Invoice Receiving


Start
Invoice
Ck. bks.
waiting invoices
?
Find
yes
Process
(Verify,etc.)
Stop
no
File in
"waiting books"
file
Stop

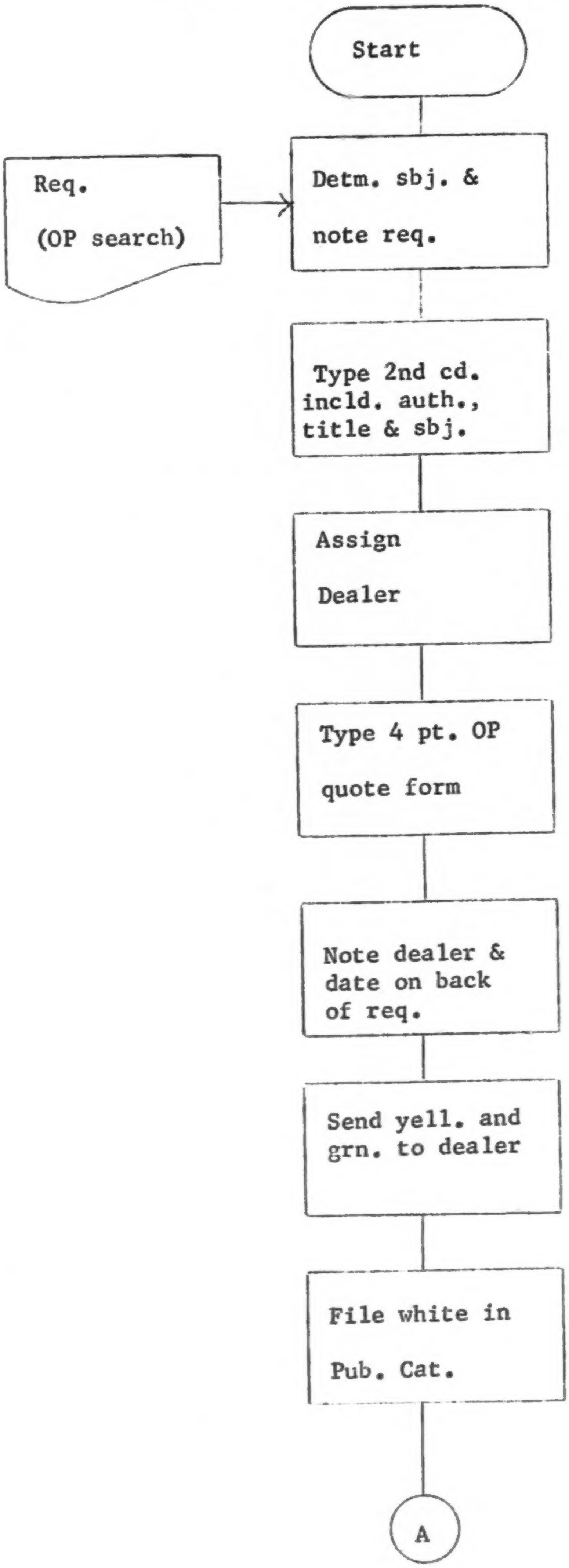
Library D--Acquisitions
Department--Accounting


Start
Invoice
Pull outstd. ord.(#) (goldenrod)
Alphabetize invoice by vendor then by date of invoice
Ck. figures on invoice & encircle date& ord. #
Note fund,notable accession & converted price (foreign)
Give invoices to supervisor
Supervisor reviews & ok's invoice
Write acct. bk. # for invoice on invoice
A

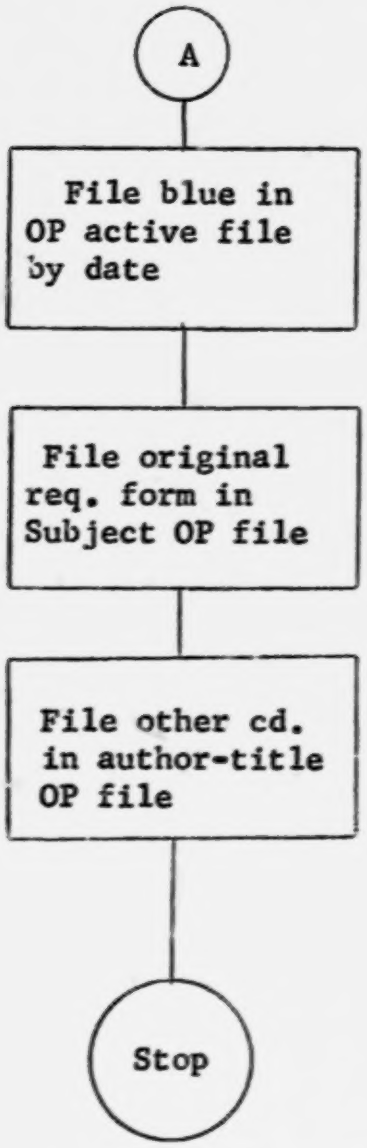
Library D--Acquisitions Department--Accounting


A
Type acct. bk. sheet
Send 1 copy of invoice to Univ. Purch.
File 1 copy of invoice
Stop

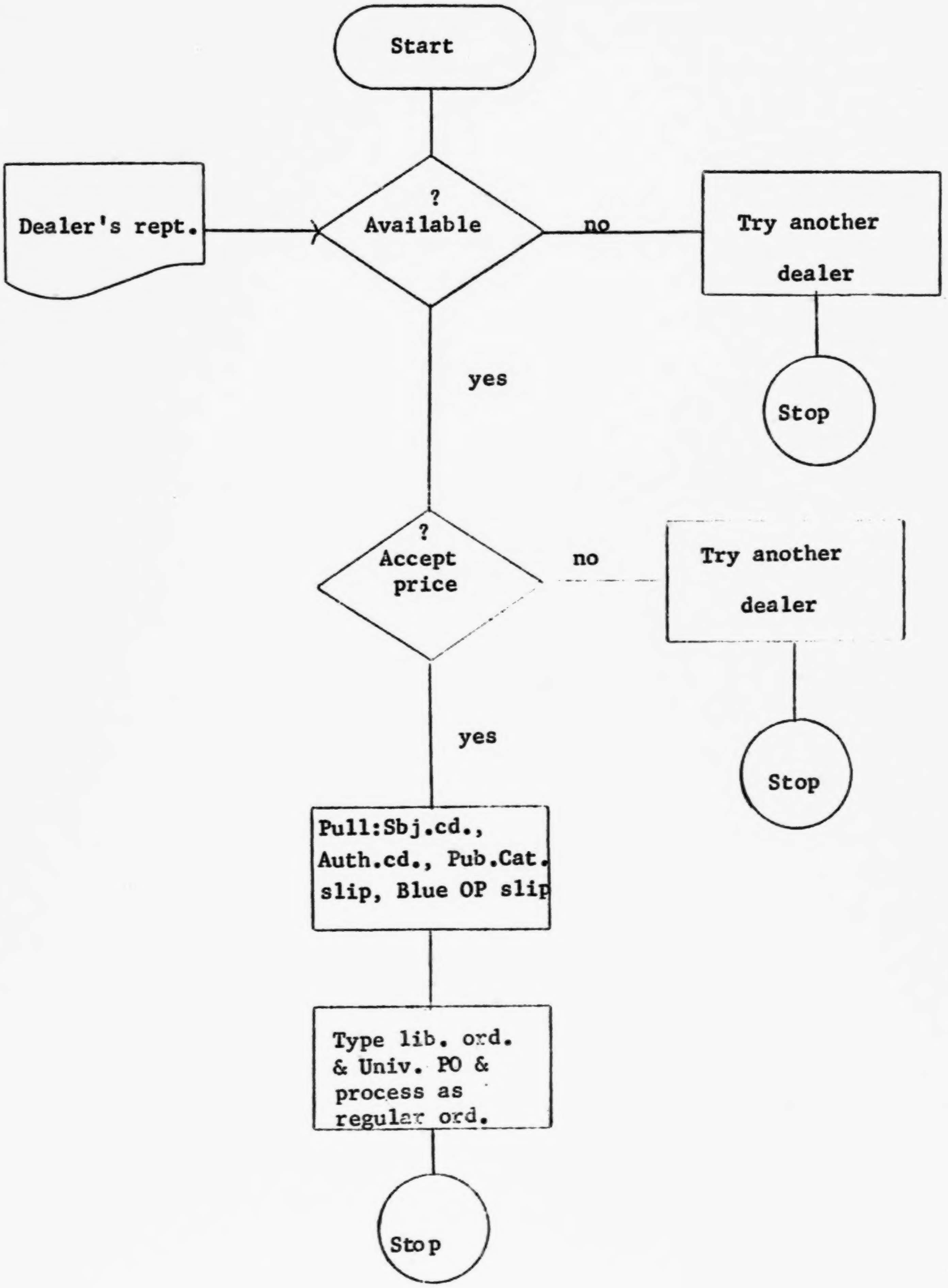
Library D--Acquisitions Department--OP


Start
Req.
(OP search)
Detm. sbj. &
note req.
Type 2nd cd.
incld. auth.,
title & sbj.
Assign
Dealer
Type 4 pt. OP
quote form
Note dealer &
date on back
of req.
Send yell. and
grn. to dealer
File white in
Pub. Cat.
A

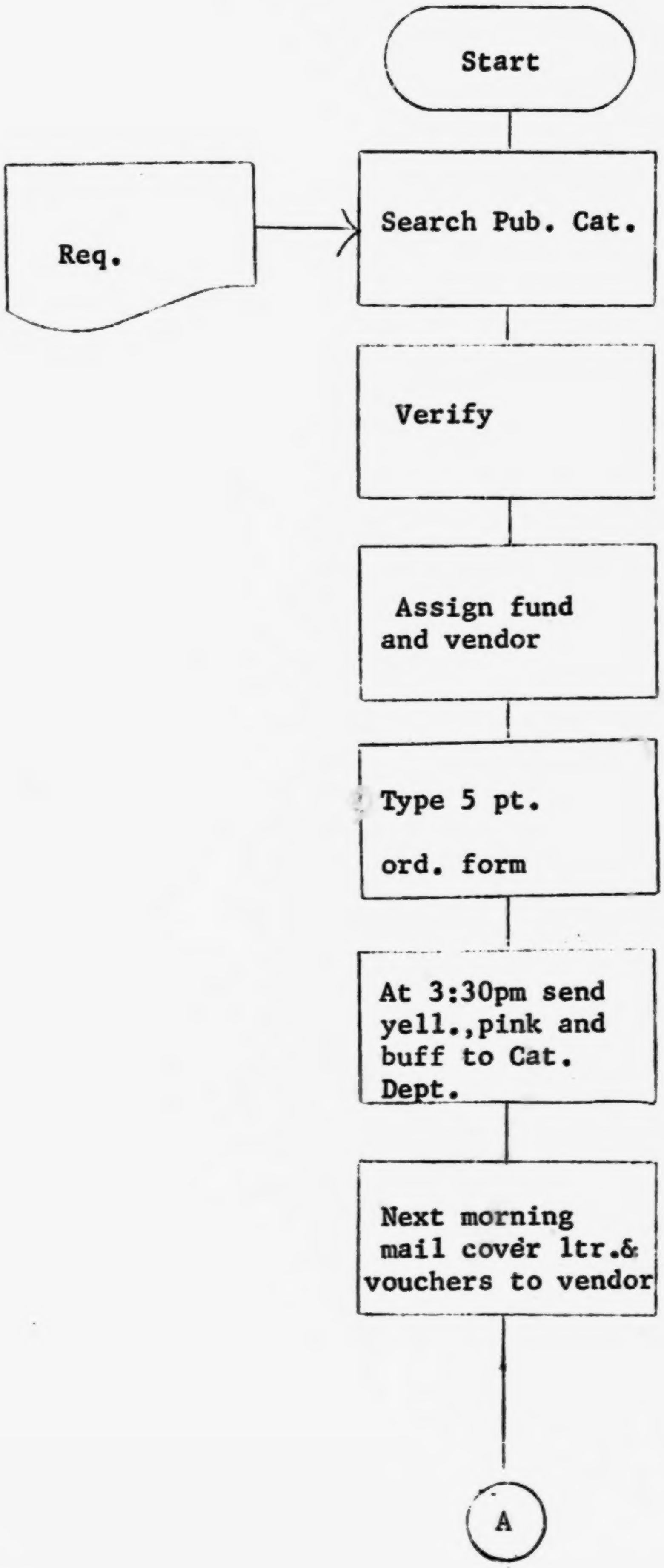
Library D--Acquisitions Department--OP


A
File blue in OP active file by date
File original req. form in Subject OP file
File other cd. in author-title OP file
Stop

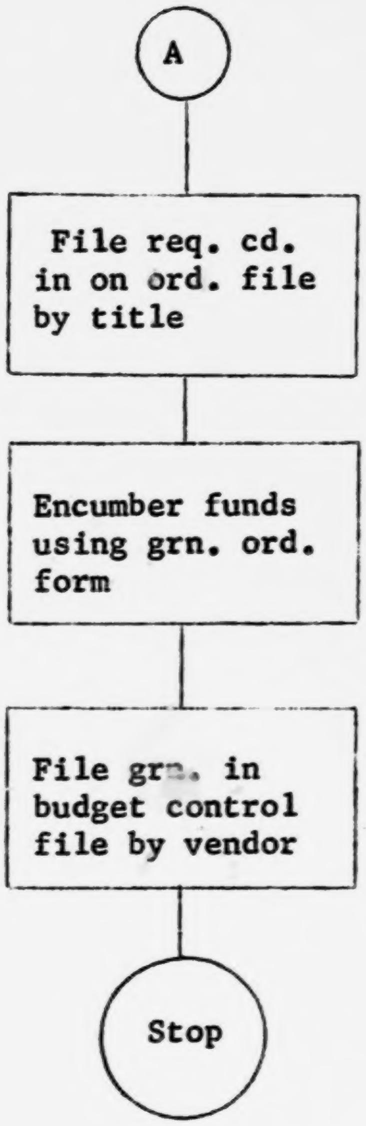
Library D--Acquisitions Department--OP Report Processing


Start
Dealer's rept.
?
Available
no
Try another dealer
Stop
yes
?
Accept price
no
Try another dealer
Stop
yes
Pull:Sbj.cd., Auth.cd., Pub.Cat. slip, Blue OP slip
Type lib. ord. & Univ. PO & process as regular ord.
Stop

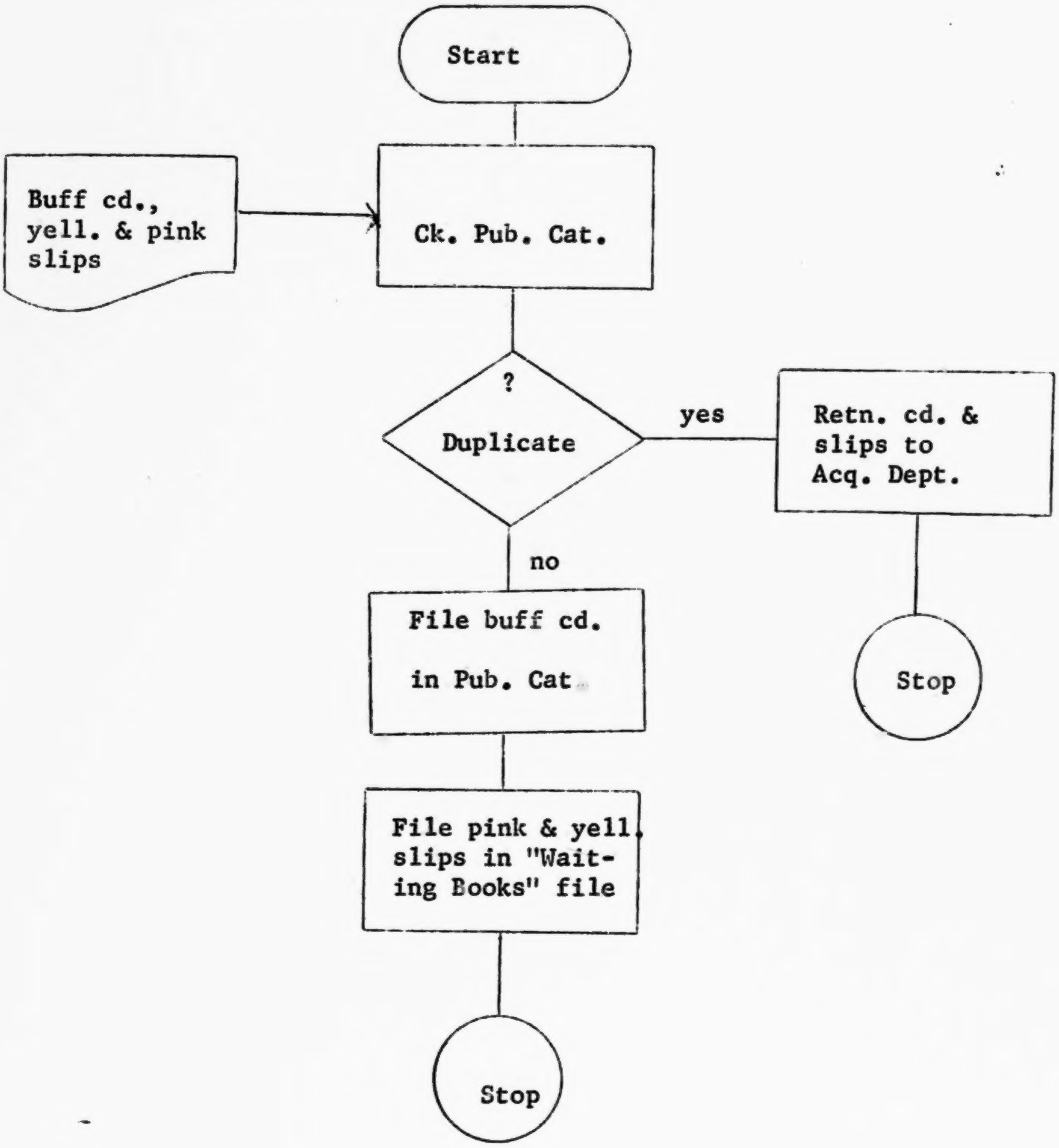
Library E--Acquisitions Department--Ordering


Start
Req.
Search Pub. Cat.
Verify
Assign fund and vendor
Type 5 pt.
ord. form
At 3:30pm send yell.,pink and buff to Cat. Dept.
Next morning mail cover ltr.& vouchers to vendor
A

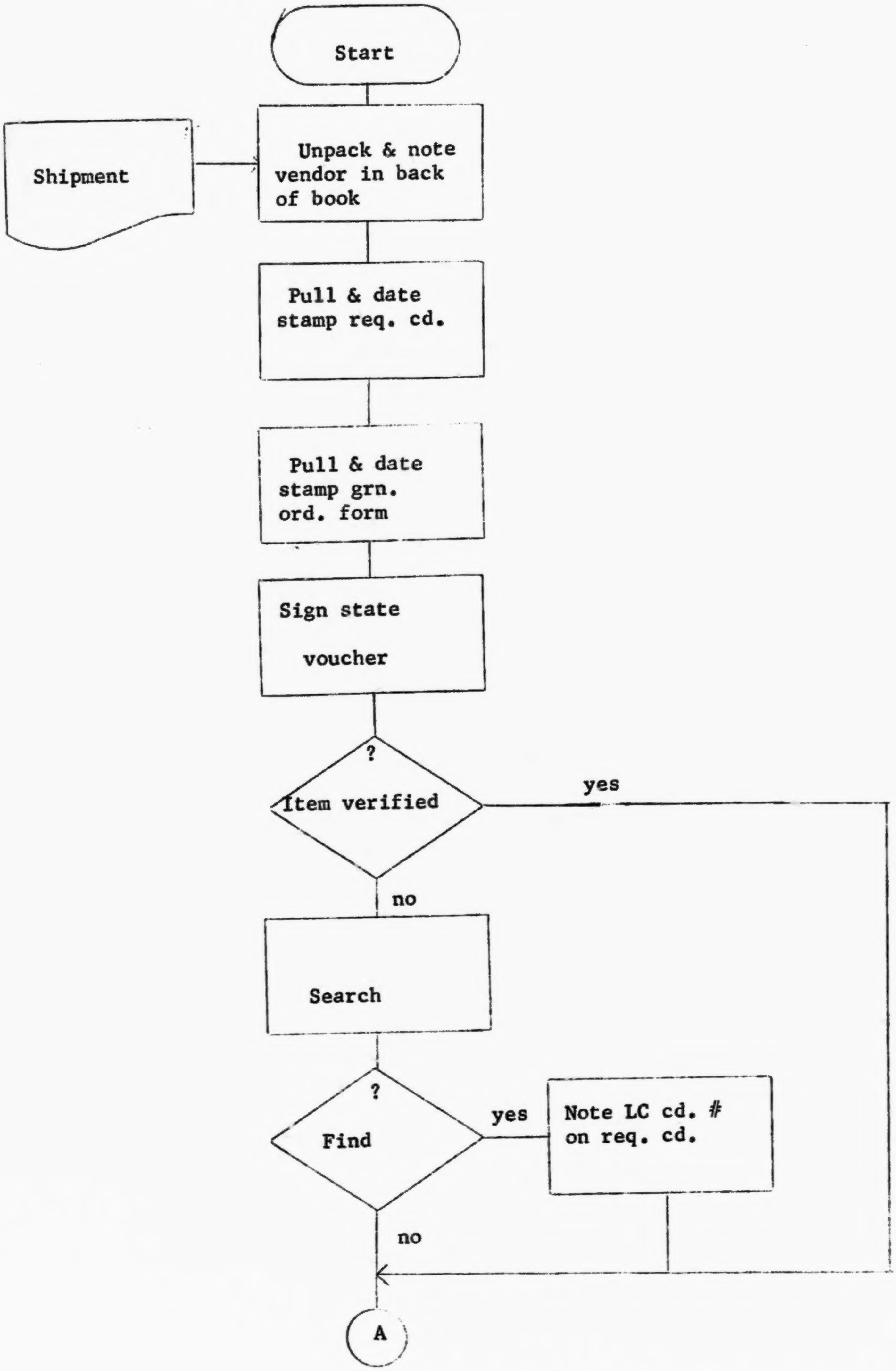
Library E--Acquisitions Department--Ordering


A
File req. cd. in on ord. file by title
Encumber funds using grn. ord. form
File grn. in budget control file by vendor
Stop

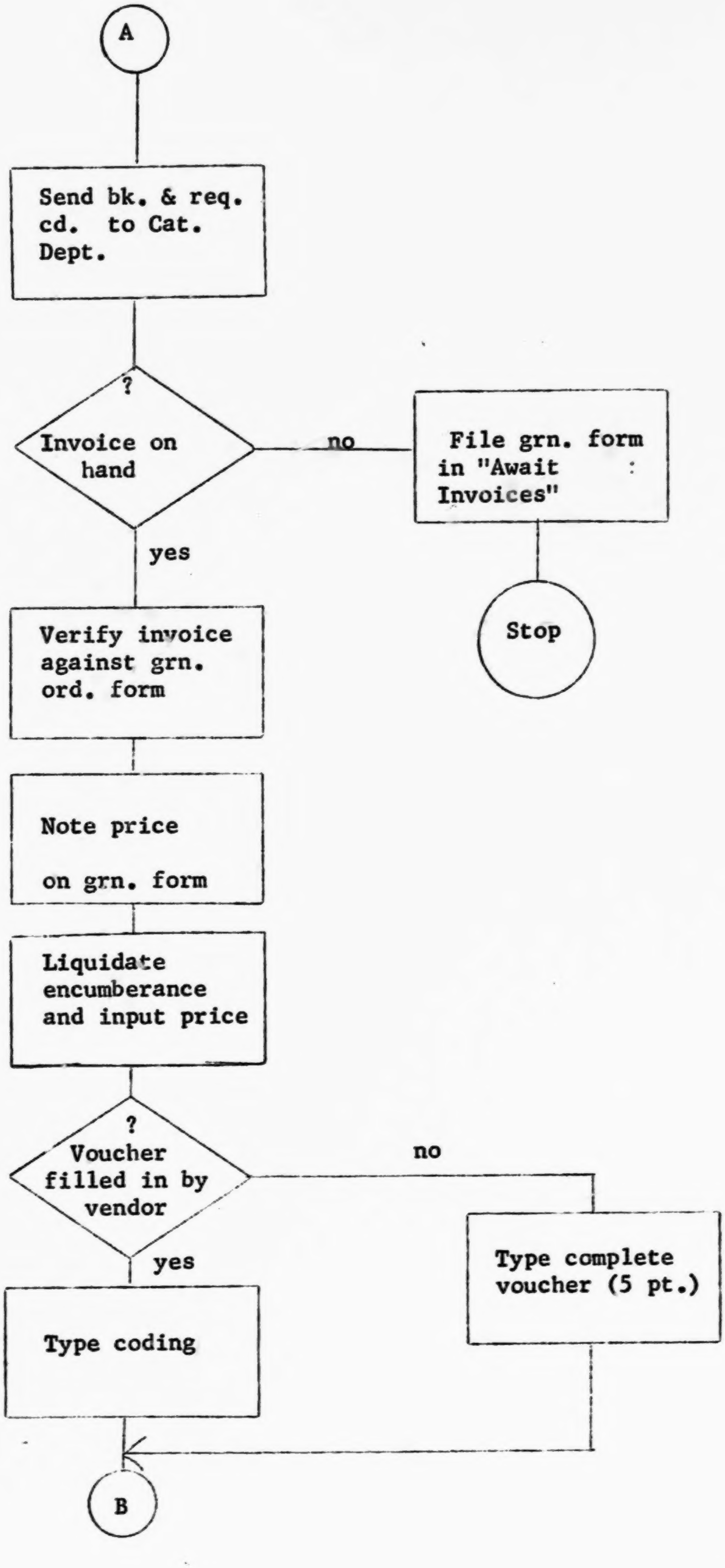
Library E--Catalog Department-- Ordering


Start
Buff cd., yell. & pink slips
Ck. Pub. Cat.
Duplicate ?
yes
Retn. cd. & slips to Acq. Dept.
Stop
no
File buff cd. in Pub. Cat
File pink & yell. slips in "Waiting Books" file
Stop

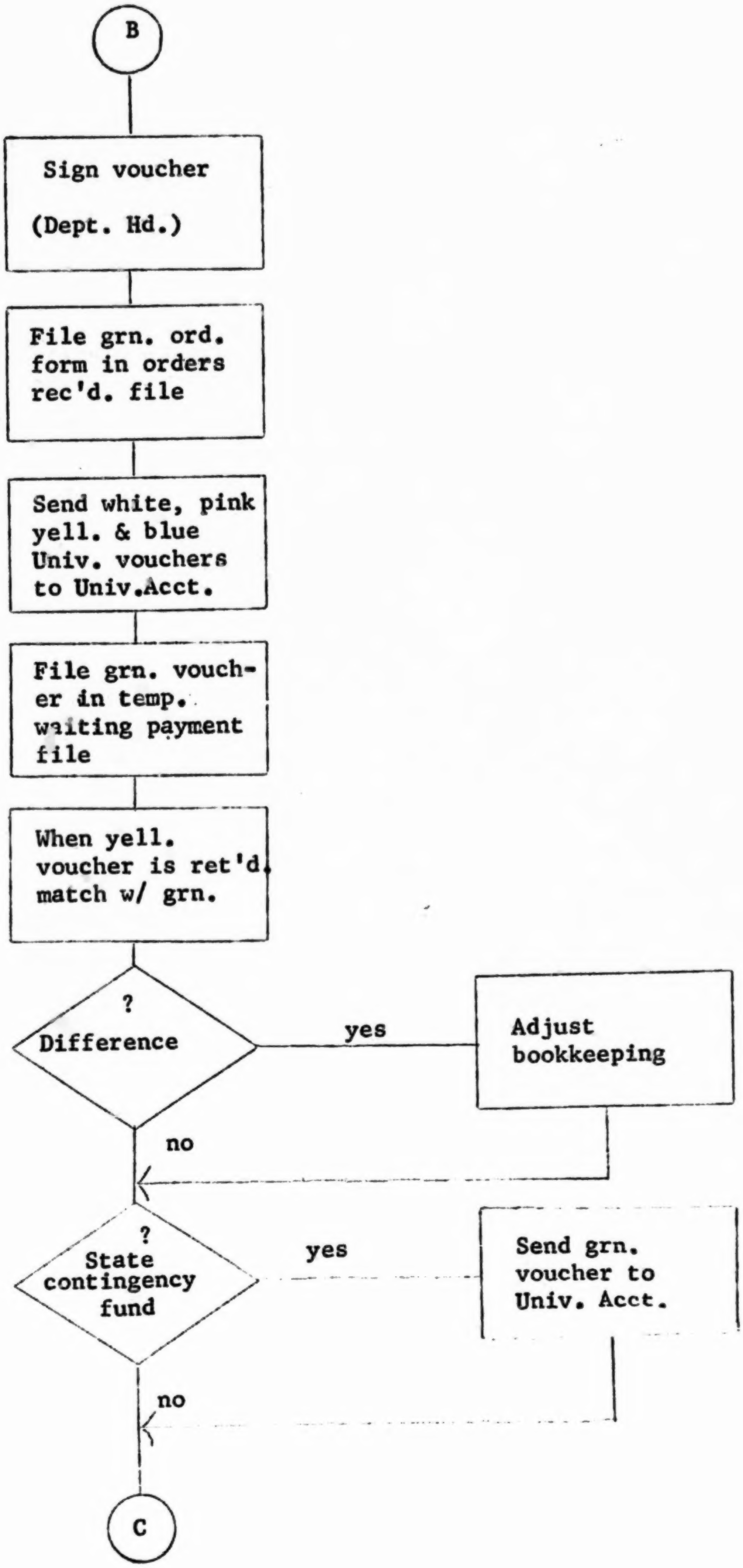
Library E--Acquisitions Department--Receiving


Start
Shipment
Unpack & note vendor in back of book
Pull & date stamp req. cd.
Pull & date stamp grn. ord. form
Sign state voucher
?
Item verified
yes
no
Search
?
Find
yes
Note LC cd. # on req. cd.
no
A

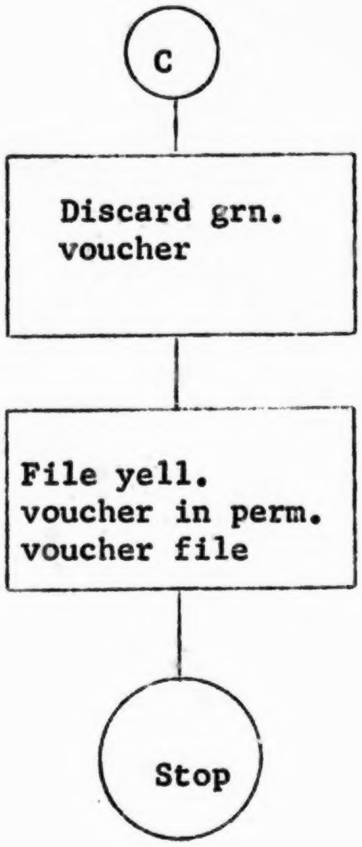
Library E--Acquisitions Department--Receiving


A
Send bk. & req. cd. to Cat. Dept.
?
Invoice on hand
no
File grn. form in "Await Invoices"
Stop
yes
Verify invoice against grn. ord. form
Note price on grn. form
Liquidate encumberance and input price
?
Voucher filled in by vendor
no
Type complete voucher (5 pt.)
yes
Type coding
B

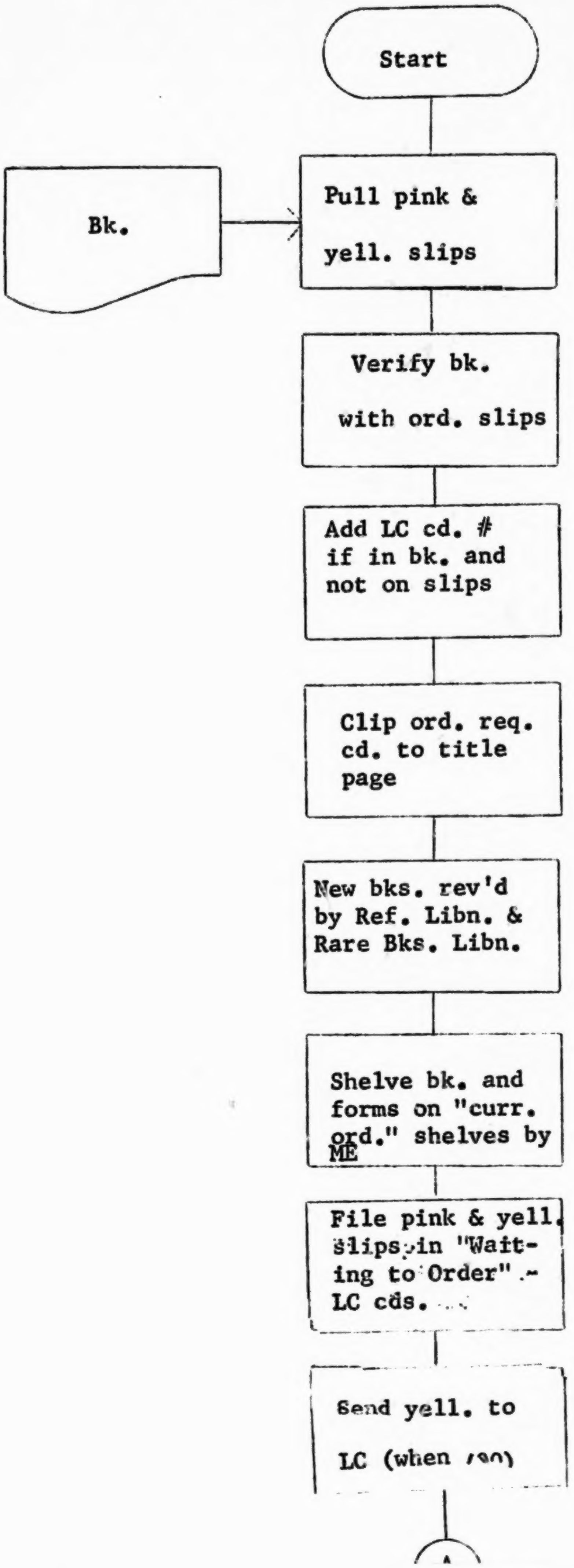
Library E--Acquisitions Department--Receiving


B
Sign voucher
(Dept. Hd.)
File grn. ord. form in orders rec'd. file
Send white, pink yell. & blue Univ. vouchers to Univ.Acct.
File grn. voucher in temp. waiting payment file
When yell. voucher is ret'd. match w/ grn.
?
Difference
yes
Adjust bookkeeping
no
?
State contingency fund
yes
Send grn. voucher to Univ. Acct.
no
C

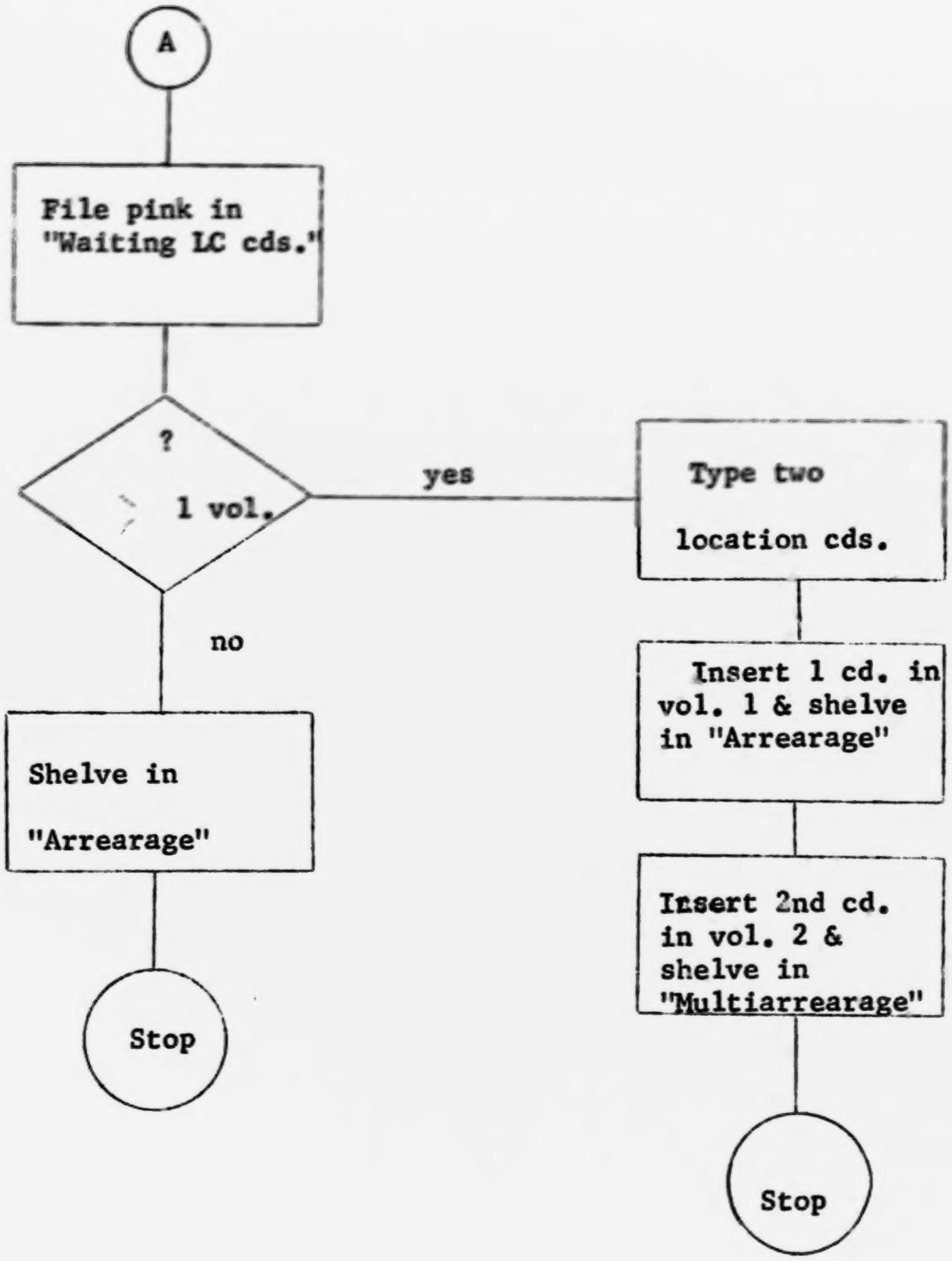
Library E--Acquisitions Department--Receiving


C
Discard grn. voucher
File yell. voucher in perm. voucher file
Stop

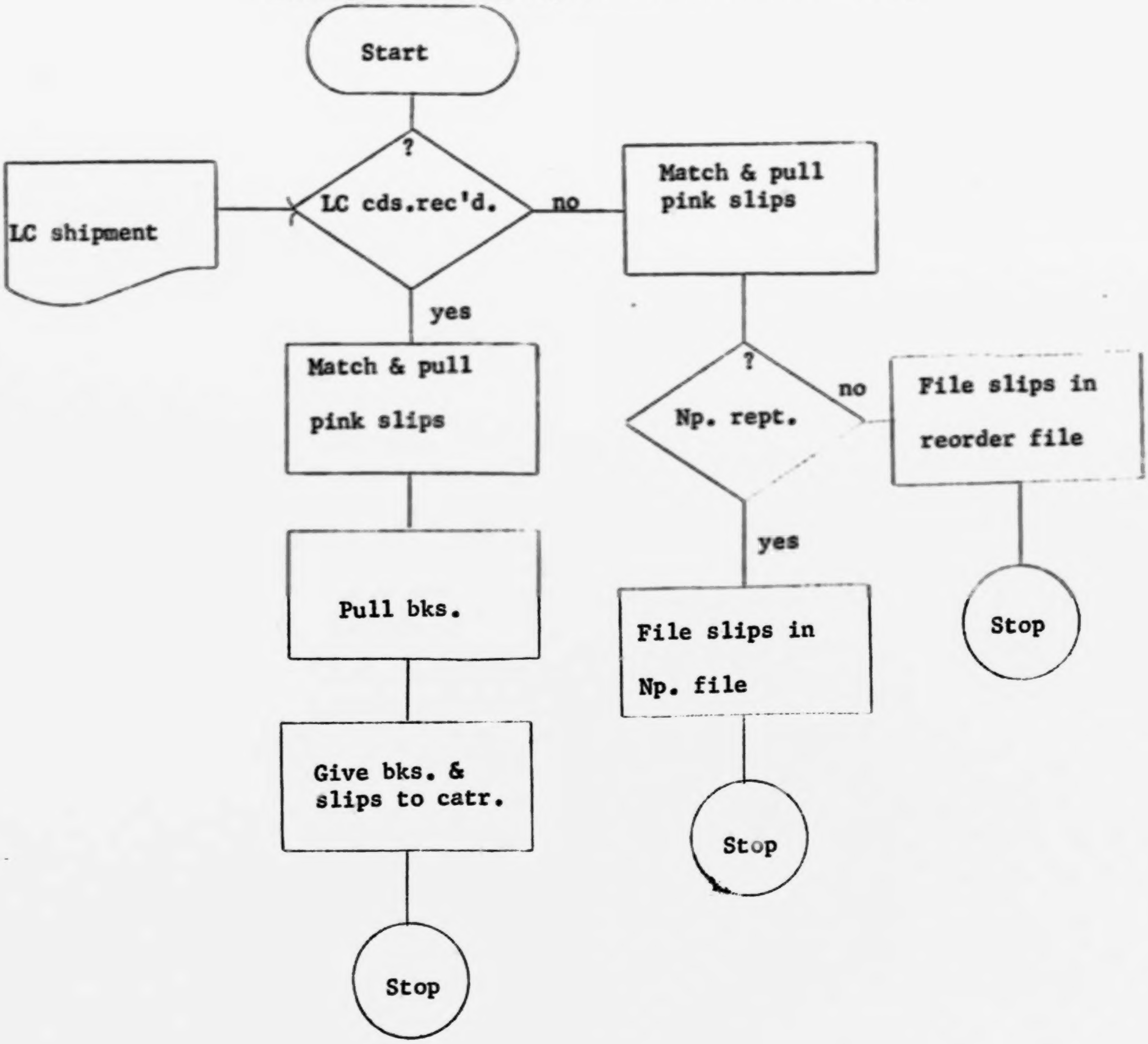
Library E--Catalog Department--LC Card Ordering


Start
Bk.
Pull pink & yell. slips
Verify bk. with ord. slips
Add LC cd. # if in bk. and not on slips
Clip ord. req. cd. to title page
New bks. rev'd by Ref. Libn. & Rare Bks. Libn.
Shelve bk. and forms on "curr. ord." shelves by ME
File pink & yell. slips in "Waiting to Order" - LC cds.
Send yell. to LC (when 100)
A

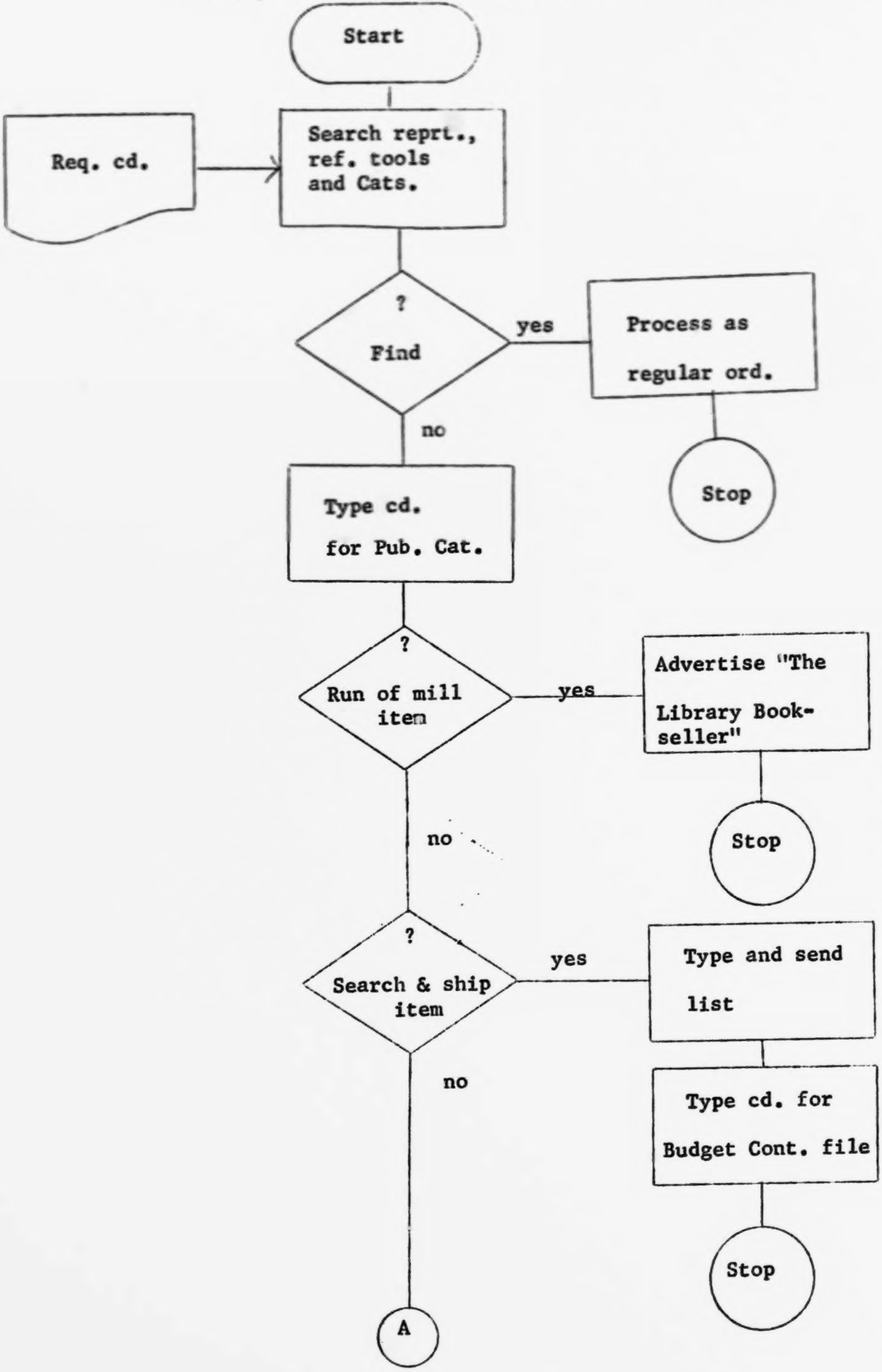
Library E--Catalog Department--LC Card Ordering


A
File pink in "Waiting LC cds."
?
> 1 vol.
yes
no
Type two location cds.
Insert 1 cd. in vol. 1 & shelve in "Arrearage"
Insert 2nd cd. in vol. 2 & shelve in "Multiarrearage"
Shelve in "Arrearage"
Stop
Stop

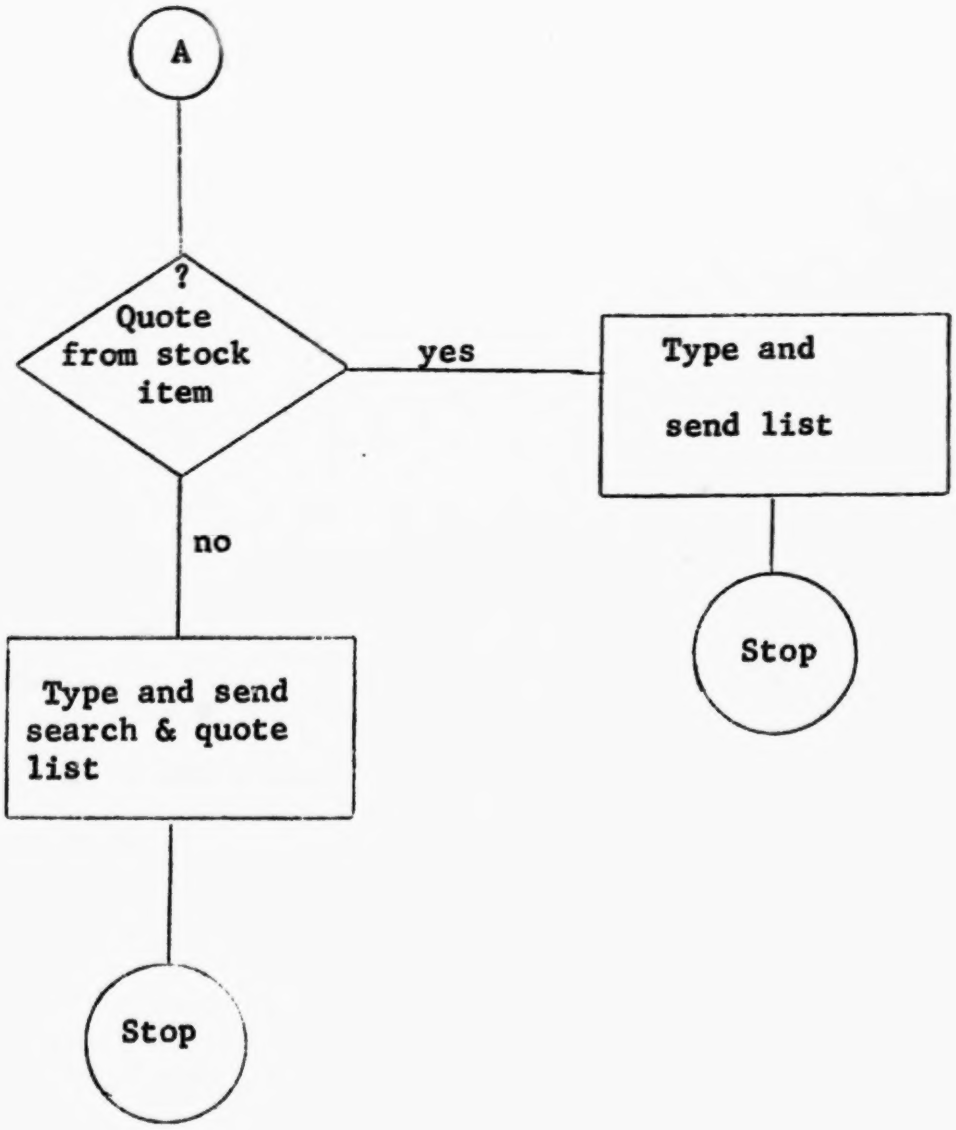
Library E--Catalog Department--LC Card Receiving


Start
LC shipment
?
LC cds.rec'd.
no
yes
Match & pull pink slips
Match & pull pink slips
Pull bks.
Give bks. & slips to catr.
Stop
?
Np. rept.
no
yes
File slips in reorder file
Stop
File slips in Np. file
Stop

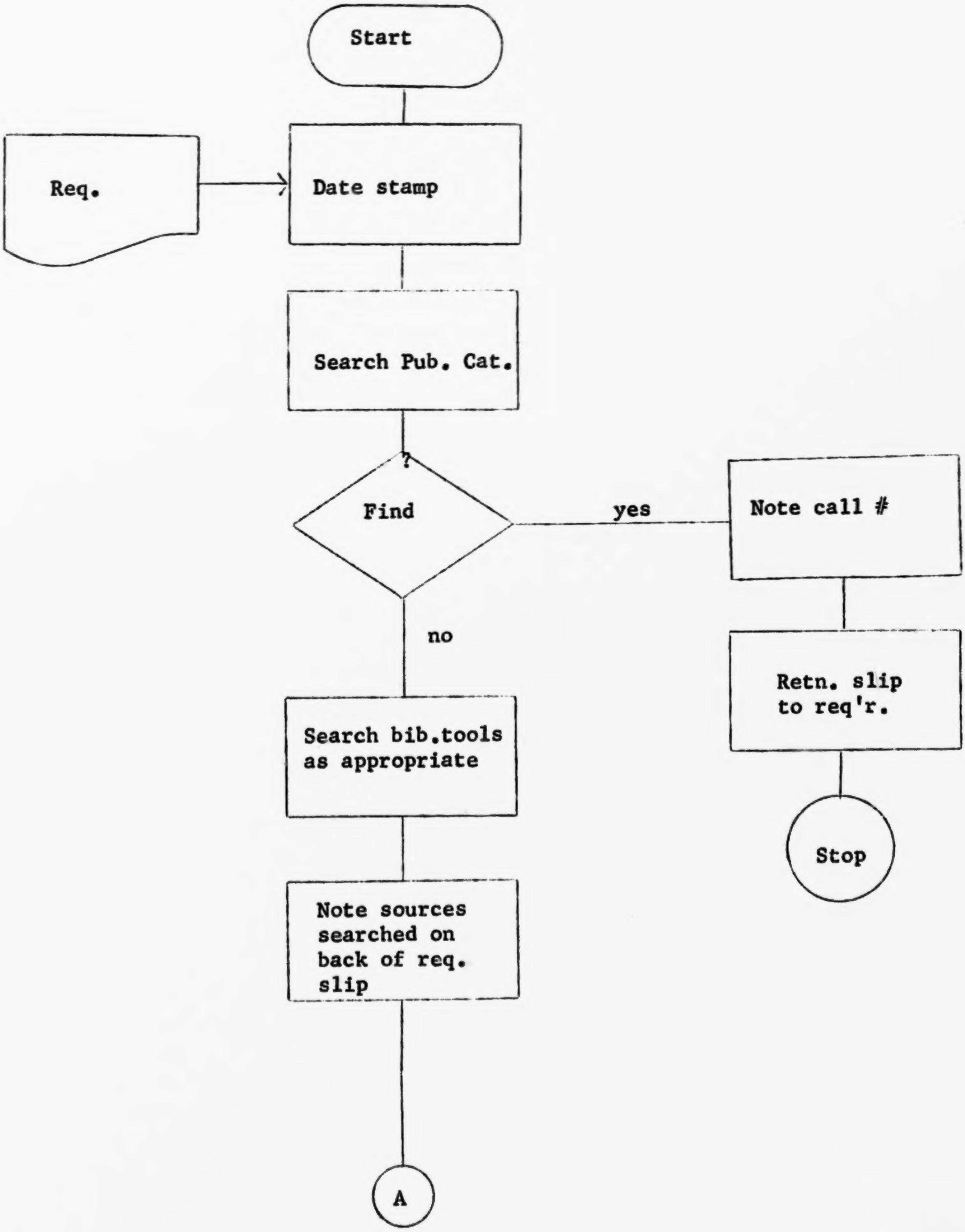
Library E--Acquisitions Department--Out of Print


Start
Req. cd.
Search reprt., ref. tools and Cats.
?
Find
yes
Process as regular ord.
Stop
no
Type cd. for Pub. Cat.
?
Run of mill item
yes
Advertise "The Library Bookseller"
Stop
no
?
Search & ship item
yes
Type and send list
Type cd. for Budget Cont. file
Stop
no
A

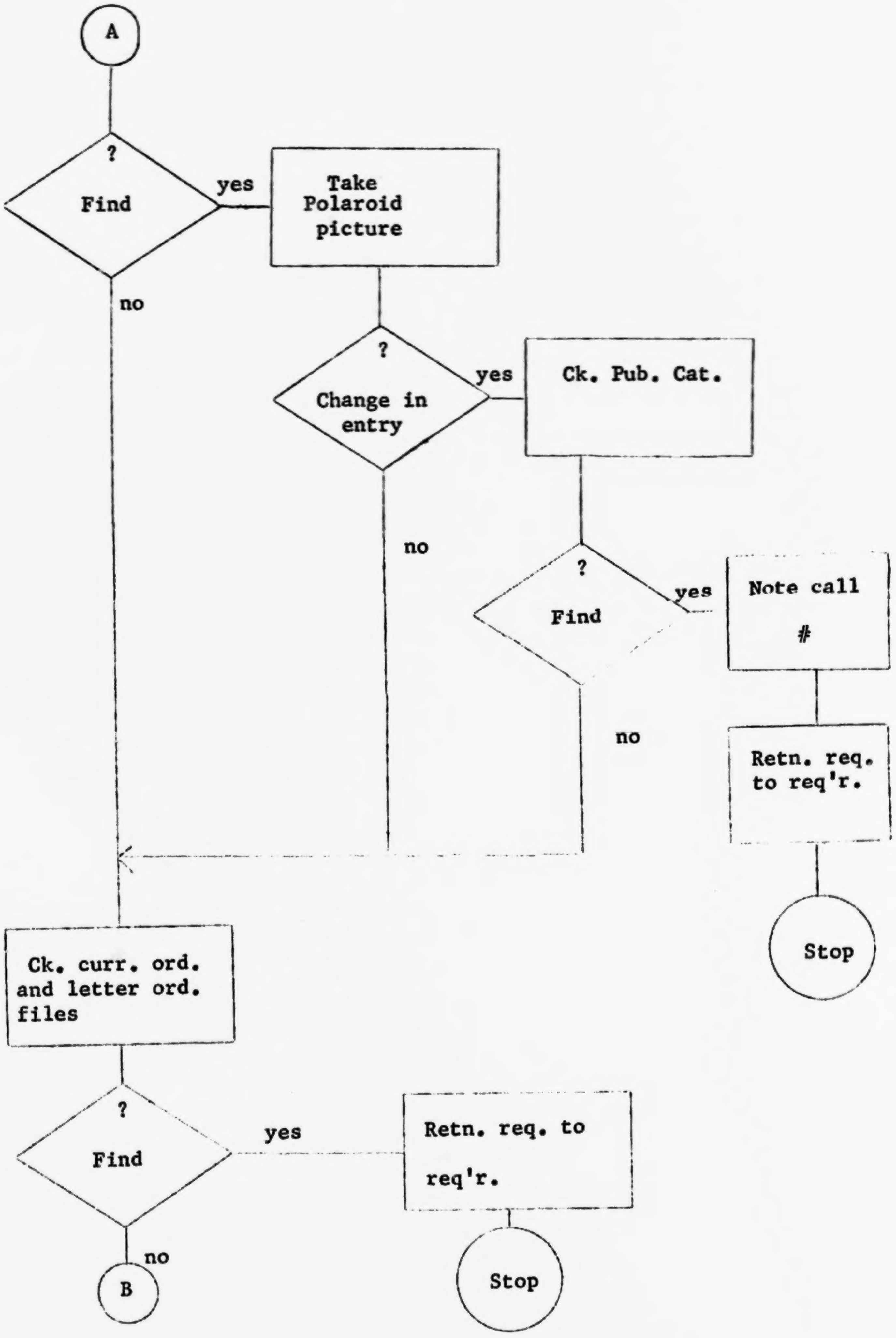
Library E--Acquisitions Department--Out of Print


A
?
Quote from stock item
yes
no
Type and send list
Stop
Type and send search & quote list
Stop

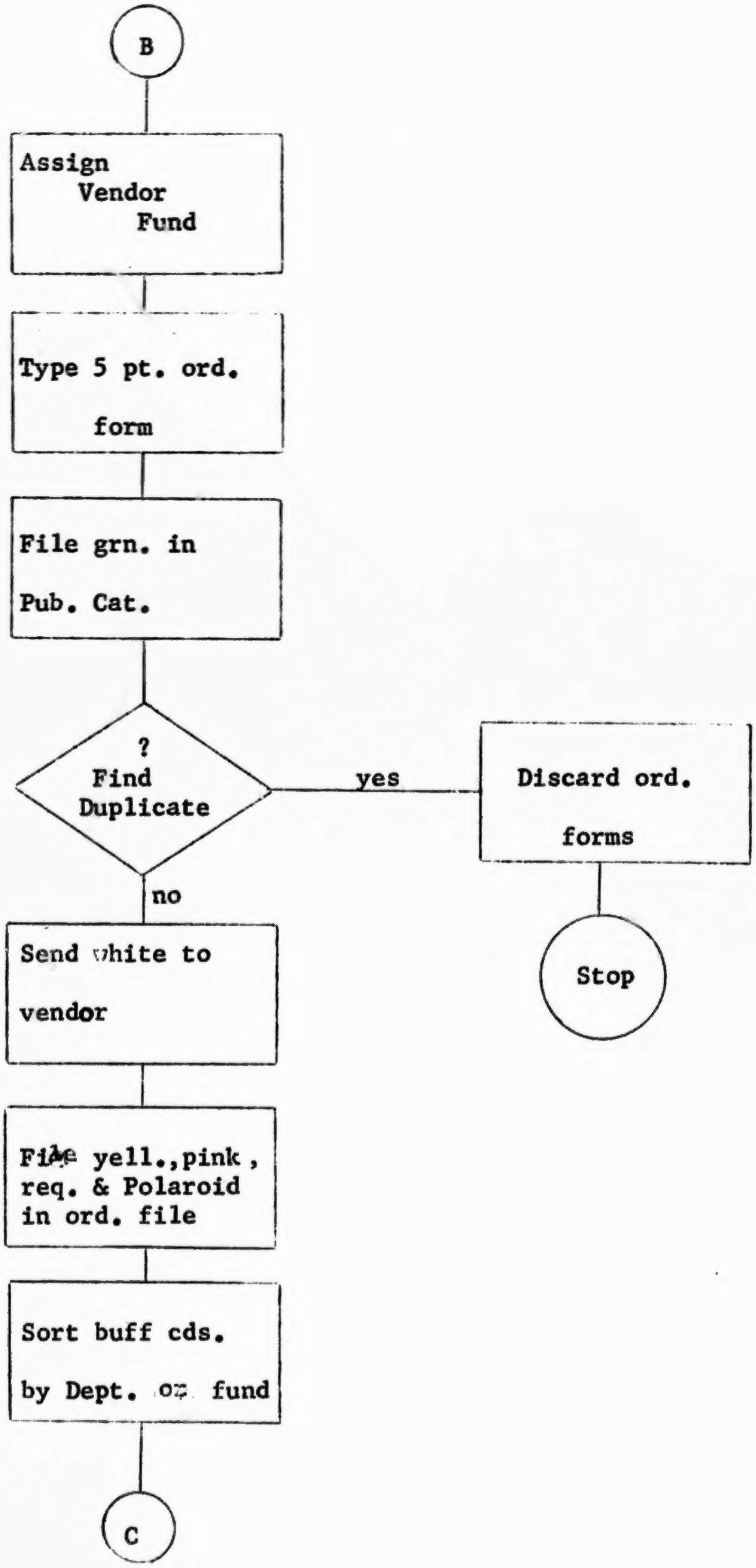
Library F--Acquisitions Department--Ordering


Start
Req.
Date stamp
Search Pub. Cat.
?
Find
yes
Note call #
Retn. slip to req'r.
Stop
no
Search bib.tools as appropriate
Note sources searched on back of req. slip
A

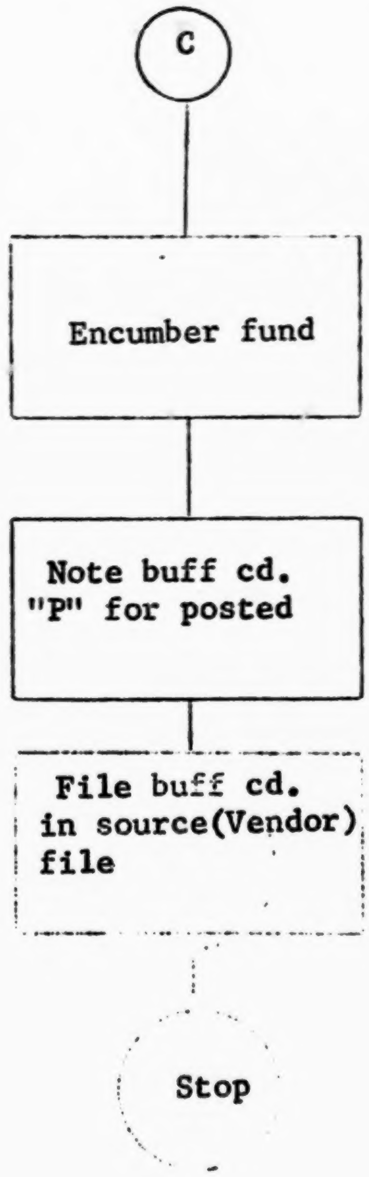
Library F--Acquisitions Department--Ordering


A
?
Find
yes
Take Polaroid picture
no
?
Change in entry
yes
Ck. Pub. Cat.
no
?
Find
yes
Note call #
no
Retn. req. to req'r.
Stop
Ck. curr. ord. and letter ord. files
?
Find
yes
Retn. req. to req'r.
no
B
Stop

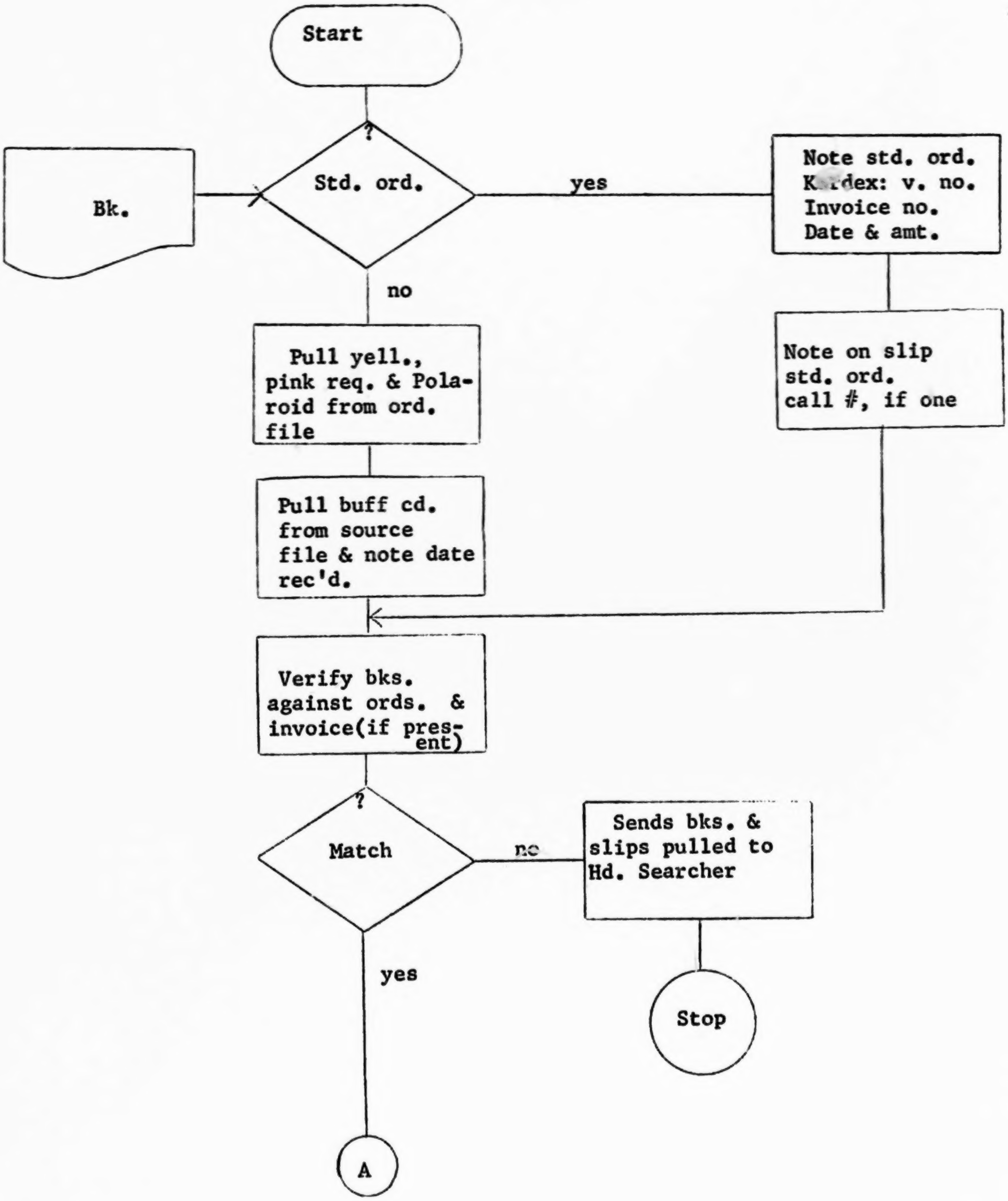
Library F--Acquisitions Department--Ordering


B
Assign Vendor Fund
Type 5 pt. ord. form
File grn. in Pub. Cat.
? Find Duplicate
yes
Discard ord. forms
Stop
no
Send white to vendor
File yell., pink, req. & Polaroid in ord. file
Sort buff cds. by Dept. or fund
C

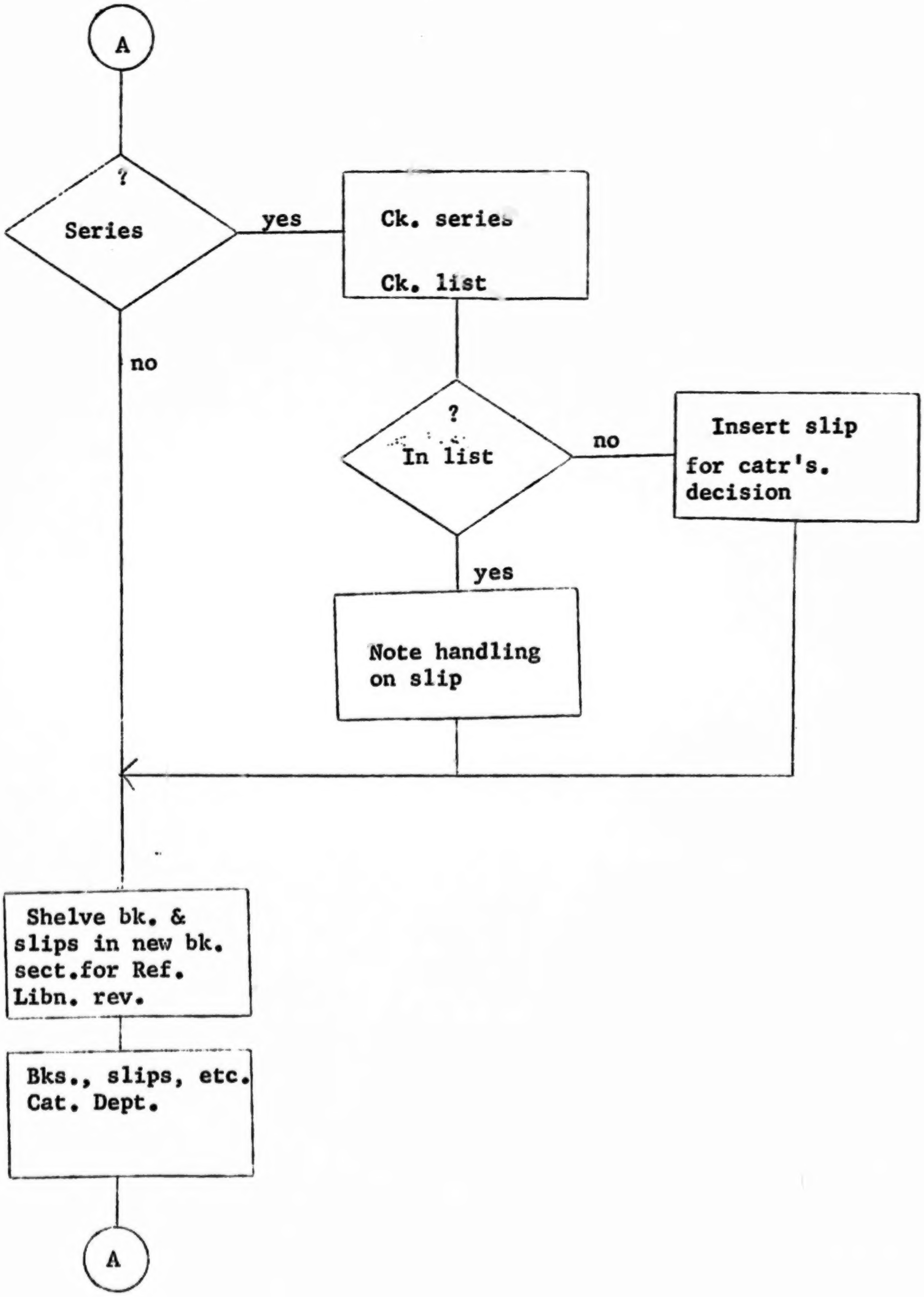
Library F--Acquisitions Department--Ordering


C
Encumber fund
Note buff cd. "P" for posted
File buff cd. in source(Vendor) file
Stop

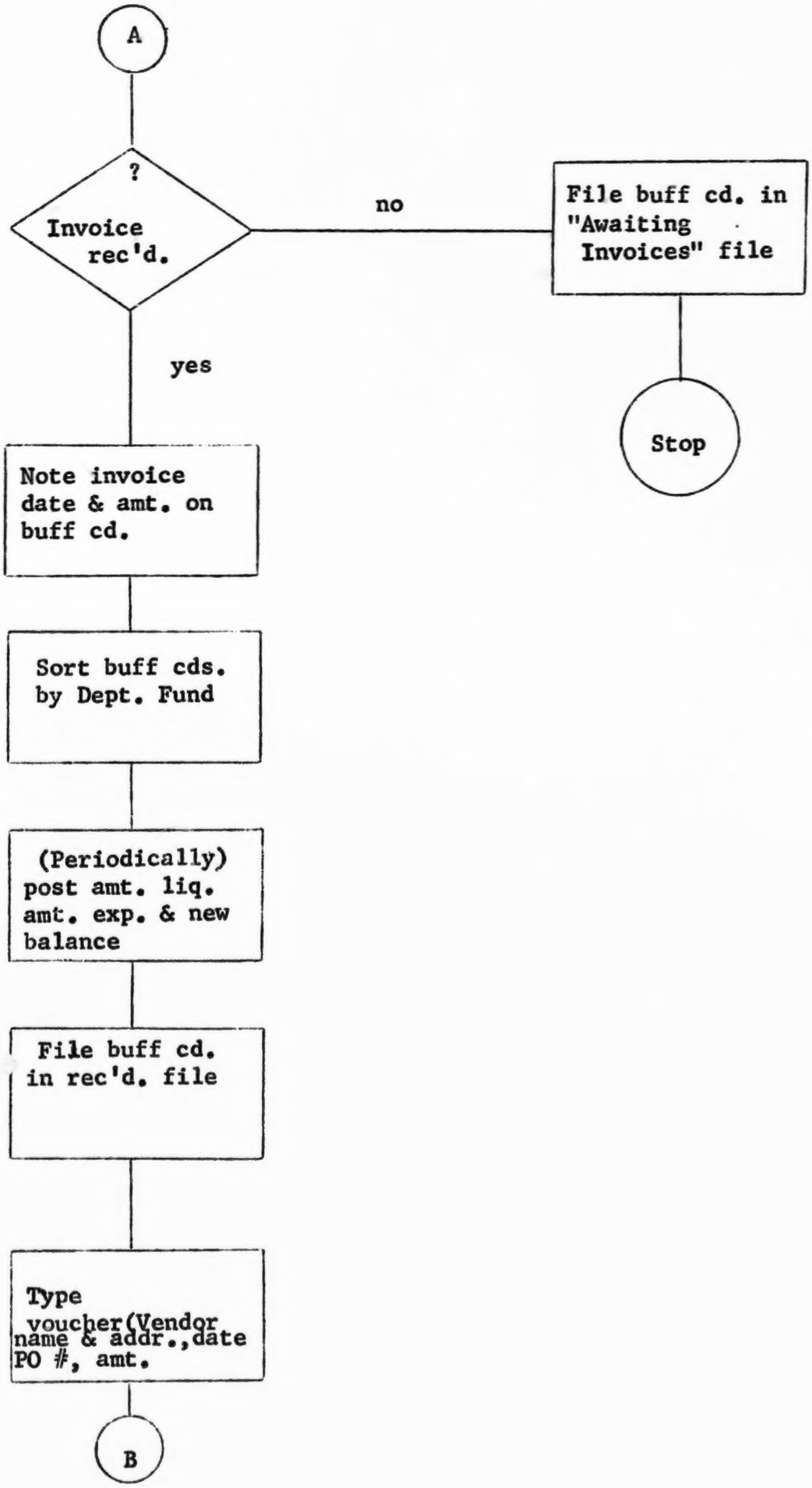
Library F--Acquisitions Department--Receiving


Start
?
Std. ord.
Bk.
yes
Note std. ord.
Kardex: v. no.
Invoice no.
Date & amt.
no
Pull yell., pink req. & Polaroid from ord. file
Note on slip std. ord. call #, if one
Pull buff cd. from source file & note date rec'd.
Verify bks. against ords. & invoice(if present)
?
Match
no
Sends bks. & slips pulled to Hd. Searcher
yes
Stop
A

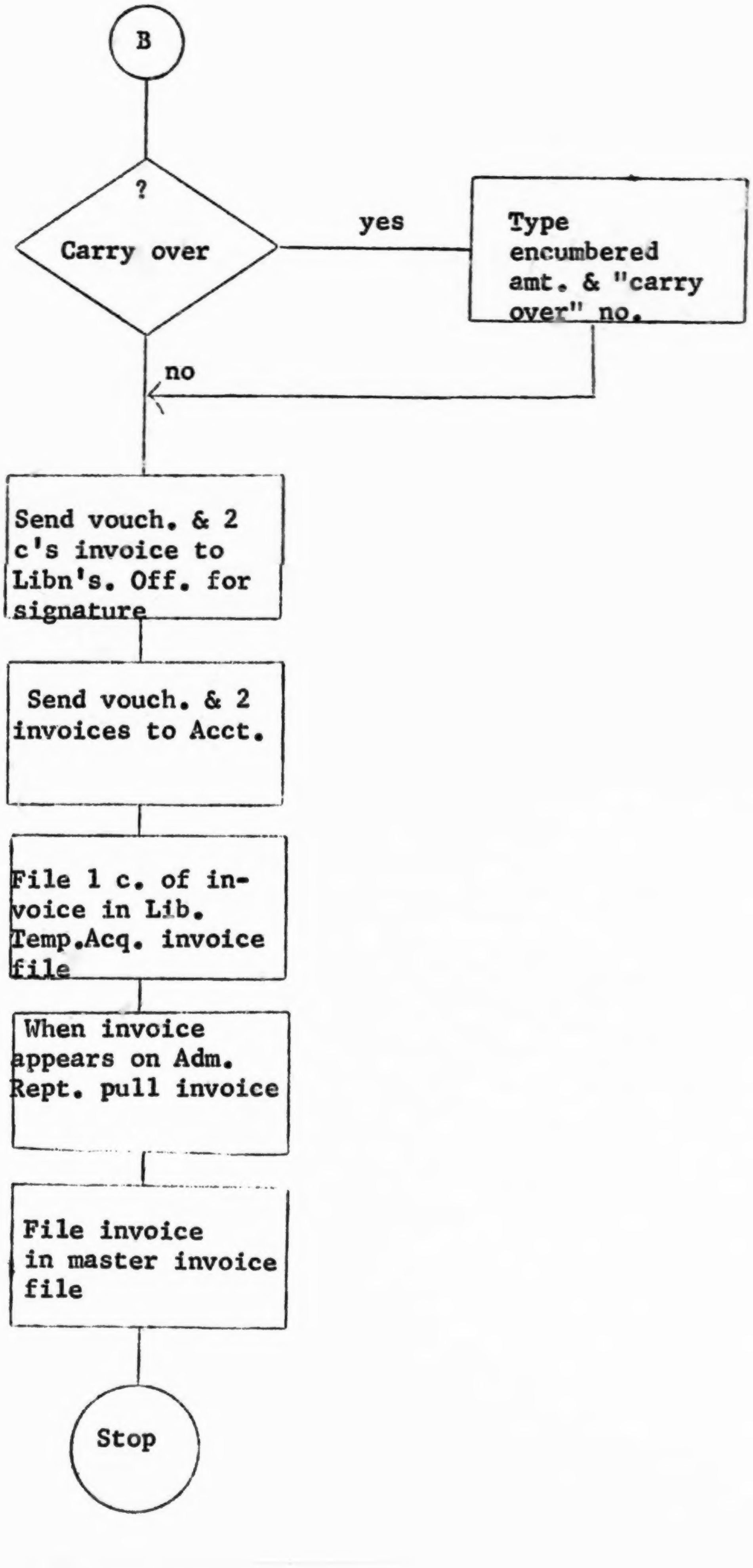
Library F--Acquisitions Department--Receiving


A
?
Series
yes
Ck. series
Ck. list
no
?
In list
no
Insert slip
for catr's.
decision
yes
Note handling
on slip
Shelve bk. &
slips in new bk.
sect.for Ref.
Libn. rev.
Bks., slips, etc.
Cat. Dept.
A

Library F--Acquisitions Department--Receiving


A
?
Invoice rec'd.
no
File buff cd. in "Awaiting Invoices" file
Stop
yes
Note invoice date & amt. on buff cd.
Sort buff cds. by Dept. Fund
(Periodically) post amt. liq. amt. exp. & new balance
File buff cd. in rec'd. file
Type voucher(Vendor name & addr.,date PO #, amt.
B

Library F--Acquisitions Department--Receiving


B
?
Carry over
yes
Type encumbered amt. & "carry over" no.
no
Send vouch. & 2 c's invoice to Libn's. Off. for signature
Send vouch. & 2 invoices to Acct.
File 1 c. of invoice in Lib. Temp.Acq. invoice file
When invoice appears on Adm. Rept. pull invoice
File invoice in master invoice file
Stop

APPENDIX B

Current Operations Questionnaire

This questionnaire was compiled to learn the cost and promptness of present technical services operations preparatory to comparing them with those of the NELINET center. When all completed questionnaires have been returned, the data will be tabulated.

Present plans call for preparation of a journal article based on the data.

Dear

The enclosed questionnaire is designed to help the New England State University librarians assemble data on the efficiency and costs of current processing operations. In particular, data are being sought about those tasks for which the NELINET operation will soon offer alternatives, catalog card and book label production. The use of uniform criteria for these data is important not for the questionable comparisons of the six libraries that become possible, but because it will allow the evaluations of NELINET services to be compared.

The following are kinds of figures these data will make possible:

1. For every dollar spent for library materials, x cents are spent for technical services salaries.

2. The average time from request of a recent American imprint until it is ready for shelving is:
   ordering________________days;
   cataloging______________days;
   dealer__________________days;
   total___________________days.

3. Cost per title for card production.

4. Cost per volume for label production.

Thank you for your cooperation.

Sincerely yours,

James E. Agenbroad
Library Systems Analyst

INSTRUCTIONS

If you do not wish your library to be identified in any subsequent publication of these data you may so specify.

Where information is unavailable or would require excessive labor for compilation, please give an estimate and indicate it by a "*".

Please return one completed copy of the questionnaire with the used work sheets and list of totals obtained in section IX to Inforonics by February 15, 1968.

The second copy of the questionnaire is for your records.

Sections I-V

It is extremely desirable that salary, book fund and book collection data have the same basis. Thus, if technical services are provided for state colleges whose book funds and collection size statistics are not included, salaries for these people should be excluded; if a branch library does its own ordering and/or cataloging, exclude their book collection and book fund data unless salaries of the branch processing staff are included with those of the main library; and if reclassification constitutes a significant proportion of the catalog dept. operation, the salaries spent for it should be excluded since reclassification is not part of the book fund or collection growth data. Please use data for the year ending June 30, 1967.

Sections VIII-IX

In these sections data on card and label production for reclassification and for state college processing may be included or not as is more convenient as long as the same procedure is followed for all three kinds of data: supplies, labor times, and production quantity.

Extra work sheets are available.

______________________Library

I. EXPENSES

I.1. Total library expenses (staff, books, equipment and supplies) for 7/66-6/67: ____________

I.2.1. Total funds for library materials: ________

I.2.2. If this included binding, how much for binding? ____________

I.2.3. If this included subscription renewals, how much for subscription renewals? ____________

I.2.4. If this included a fund for new subscriptions, how much for new subscriptions? ____________

I.3.1. How much for new furniture and equipment? Total library ____________, catalog dept. ____________, order dept. ____________.

I.3.2. How much for maintenance and repair of furniture and equipment? Total library____________, catalog dept. ____________, order dept.____________.

I.3.3. How much for leased equipment? Total library____________, catalog dept. ____________, order dept. ____________.

I.4. How much for supplies? Total library ________, catalog dept. _________, order dept. __________.

II. PHYSICAL PLANT

Estimated replacement cost of:

a. Library with entire contents_____________

b. All equipment and furniture______________

c. Catalog dept. equipment and furniture_______

d. Order dept. equipment and furniture________

e. Card and label production equipment and furniture

____

III. PERSONNEL AND SALARIES

III.1. Total Library staff:

Librarians _______man years _______cost

Clerical ________man years _______cost

Student _________hours _______cost

III.2. Catalog Dept. Staff

Librarians ________man years ________cost

Clerical __________man years ________cost

Student ___________hours ________cost

III.3. Order Dept. Staff (Please include bookkeeping even when done elsewhere in the library)

Librarians ________man years ________cost

Clerical __________man years ________cost

Student ___________hours ________cost

III.4. Head of technical processing and immediate staff:

Librarians ________man years ________cost

Clerical __________man years ________cost

Student ___________hours ________cost

III.5. Other technical processing staff (binding, serials, reclassification, archives, maps, govt. docs., processing for state colleges, etc.)

Librarians ________man years ________cost

Clerical __________man years ________cost

Student ___________hours ________cost

What areas does this include?

III.6. Administrative staff of library:

Librarians ________man years ________cost

Clerical __________man years ________cost

Student ___________hours ________cost

III.7. Hours per week: librarians ________ clerks________

Weeks per year: librarians ________ clerks________

Paid holidays per year _________.

IV. COLLECTION SIZE

1. Total in library on June 30, 1967 _____vols; _____titles
2. Does this include govt. docs? _____
3. Does this include microforms? _____
4. Serials _________vols. _______titles

V. COLLECTION GROWTH 7/66-6/67

1. Added ______vols; _______titles;
2. Cataloged by staff in III.2. ________vols;______titles;

If V.1 and 2 differ, why? (Uncataloged documents, gifts, etc.)

3. Cataloged for branches ______vols. _______titles.
4. Serials added ______vols. _______titles.
5. Gifts added _______vols. _______titles.
6. Reclassified ______vols. _______titles.

VI. SPACE

VI. Square feet devoted to the following: Catalog Dept. _________; Order Dept. __________; Administrative ________; Stack space _________; All staff work space ___________; Total library_______________.

VII. OPERATION TIMES

VII.1. Select randomly from books going from processing to the stacks 30 recent American trade titles and supply as much of the following data for each as possible.

	A. Date requested by faculty	B. Date order sent out	C. Date book rec'd or paid for	D. Date sent to cat. dept.	E. Date sent to stacks
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					

	A	B	C	D	E
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

VII. 2. Select randomly from cards just typed and about to be arranged for filing into the catalog 30 main entries for recent American trade titles and supply as much of the following data as possible:

	A. Date requested by faculty	B. Date order sent out	C. Date book rec'd or paid for	D. Date sent to cat. dept.	E. Date of this test
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

	A	B	C	D	E
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

VIII. SUPPLY COSTS

VIII. List actual or estimated supply costs for card and label production during 7/66-6/67. Please add items omitted from the list. Where supplies are also used for other purposes (typewriter maintenance for instance) estimate the proportion used for card and label production.

1. Card stock
2. L.C. cards
3. L.C. proof slips
4. Pressure sensitive labels
5. Polaroid film
6. Xerox supplies
7. Xerox maintenance
8. Flexowriter maintenance
9. Flexowriter supplies
10. Typewriter maintenance
11. Selin supplies

12. Xerox rental ____________
13. Snopake ____________
14. Other, specify____________ ____________
15. ____________________ ____________
16. ____________________ ____________

IX. LABOR TIME, COSTS, AND PRODUCTION

IX.1.1. Procedure: 1. For one "normal" week, have all staff involved in production of cards and labels fill out the daily work sheets indicating the minutes they spend at each task. It should be stressed that all the time devoted to producing cards and labels is to be included but that the time spent using the final product (such as filing catalog cards and pasting labels) should be excluded.

IX.1.2. At the end of the week arrange the sheets according to the salary of the workers.

IX.1.3. Add together the minutes spent at each task by all individuals earning the same salary and working the same hours/week/year.

IX.1.4. List these totals on a separate sheet in the format:

TASK	MINUTES	SALARY	PER
A1	360	1.75	hr.
A1	2400	3,000	yr.

IX.2. In a locally convenient manner, obtain data on card sets produced and volumes labelled during the above week: _____sets; ______vols.

X. L.C. COPY

Proportion of acquisitions for which L.C. cataloging (L.C. cards, proof slips, title II cards, PW, or LC entries in NUC) is not used (not available or too slow).

____

If L.C. cards are ordered, how long until receipt of the bulk of an order? ____________

XI. OVERHEAD

XI.1. If any of the following are excluded from the library expenses in I. above but are incurred by operation of the library, please list or estimate below the amount spent during 7/66-6/67. (For instance, if the president, vice president and treasurer devote one half their time to fund raising and four per cent of the funds raised are applied to library operation, then two per cent of their salaries are spent to acquire operating funds for the library.)

XI.2. If a figure used by the university to compute the overhead costs on applications for federal research grants (at one university an additional 40% of the salaries of the researchers) is an accurate indicator of the library overhead (covers all the items listed below) write it here and explain its use: ____

____

If such a figure exists, but does not reflect library overhead, write it here; explain its use and then give data for items not covered below. ______________________________

____

XI.3. Fringe benefits to library staff (if overall fringe benefits per person or per faculty and per clerical figures are available just supply them.)

a. University retirement contribution __________
b. University health insurance contribution __________
c. University life insurance contribution __________
d. Travel expenses paid to staff __________
e. Relocation grants to new staff __________
f. Tuition grants to staff and their families __________
g. Staff use of University subsidized clinic __________
h. Staff use of University subsidized housing __________
i. Other, please specify____________________ __________

XI.4. Utilities: ____________

a. Heat ____________

b. Air conditioning ____________

c. Electricity ____________

d. Water ____________

e. Telephone ____________

f. Postage ____________

g. Other, specify ________________ ____________

XI 5. Services:

a. Messenger ____________

b. Payroll and Billing ____________

c. Accounting and Auditing ____________

d. Janitorial ____________

e. Architectural and Interior Decorating ____________

f. Equipment purchase handling ____________

g. Printing ____________

h. Grounds ____________

i. Repairs to building and equipment ____________

j. Data processing, programming and computer time ____________

k. Personnel services such as typing tests for clerks ____________

l. Fund raising by alumni office and university administration ____________

m. Proportionate share of general university overhead such as news bureau, fire insurance, etc. ____________

n. Other, specify _________________________ ____________

XII. QUESTIONNAIRE

XII.1. Estimated time and cost of completing this questionnaire. ______________________________

XII.2. Comments on this questionnaire.

Circle One: librarian clerk student Salary: $ ______ per
Date ____________ Hours per week worked ______; weeks per year worked

INSTRUCTIONS: Write the minutes you work at any task during each hour in the box for it.

	ACQUIRE COPY						PREPARE COPY							REPRODUCTION						
Hour	A1 Filing proof slips or Title 2 cards	A2 Searching NUC, proof slip or T2 files	A3 Ordering LC cards	A4 Receiving LC cards	A5 Polaroid camera use & maintenance	A6 Supervise & train A1 - A5	P1 Modify LC card, slip or Polaroid copy	P2 Trim & paste Polaroid copy	P3 Type call number on LC card or slip	P4 Type & edit card for Xerox	P5 Arrange cards for reproduction	P6 Type & edit copy for Flexowriter	P7 Supervise & train P1 - P6	R1 Xerox maintenance, clean, load etc.	R2 Xerox operation	R3 Flexowriter maintenance, load, etc.	R4 Flexowriter operation	Separate & arrange cards	Supervise an	Typ
8 - 9																				
9 - 10																				
10 - 11																				
11 - 12																				
1 - 2																				
2 - 3																				
3 - 4																				
4 - 5																				
other hours																				
Total																				

Salary: $ ______ per ______
_; weeks per year worked ______

			REPRODUCTION						TYPING					LABELS				Other Specify		
P5	P6	P7	R1	R2	R3	R4	R5	R6	T1	T2	T3	T4	T5	L1	L2	L3	L4	01	02	
	edit copy for produc- exowriter	Supervise & train P1 - P6	Xerox maintenance, load clean, etc.	Xerox operation	Flexowriter maintenance, load, etc.	Flexowriter operation	Separate & arrange cards	Supervise and train R1 - R5	Typing entire cards	Typing onto unit cards	Revision of typing	Typing Corrections	Supervise & train T1 - T4	Spine label typing	Pocket typing	Spine label & pocket revision	Supervise L1 - L3			Hour
																				8 - 9
																				9 - 10
																				10 - 11
																				11 - 12
																				1 - 2
																				2 - 3
																				3 - 4
																				4 - 5
																				other hours
																				Total

LS 1 December 1967

APPENDIX C

TECHNICAL MEMORANDUM NO. 261

TO: NEBHE File

FROM: William R. Nugent

SUBJECT: An Algorithm for Splitting the LC Call Number

DATE: February 8, 1968

1. INTRODUCTION

Man has been able to successfully split the atom and the infinitive, but the LC Call Number still defies simple solutions. A new algorithm is presented here. It works on Ann Curran's list of 39 examples (TM 233-9/26/67) and on LC's list of 6. These examples and the results of applying the algorithm to them are contained in pages C8 - C13 of this memo. The algorithm is a multiple pass process that first identifies kinds of elements in the linear string form of the call number, and then formats these according to their identity and the maximum column length. Sequences of alpha characters, numeric characters, and punctuation are used as a guide to identification and division. Beginning and end of line punctuation is generally dropped where item division is its only function, because end-of-line is itself a strong division, such punctuation is therefore redundant in column form, and conservation of space is achieved.

The Curran and LC examples are shown to illustrate the algorithm; interested staff members are invited to try it on other examples and determine what circumstances, if any, would cause the algorithm to incorrectly split.

2. ALGORITHM

The linear string of input symbols is taken in strict sequence from left to right and up to 8 classes of items are identified and extracted. The extracted items are then examined and divided where necessary to maintain a 6 character column. The items are then further scanned to concatenate certain short items occupying separate lines. The process, therefore, has 4 parts:

1. identification
2. extraction
3. division
4. concatenation

2.1 Identification and Extraction

Eight classes of items are identified, which we will refer to by their class numbers:

1. Alphabetic portion of class number
2. Initial numeric portion of class number
3. Decimal fraction portion of class number
4. Book number (initial alpha numeric portion)
5. Year designation
6. Alpha numeric designator (part numbers, etc.)
7. Other
8. Initial alphabetic designator (e.g., microfiche, incunabula, etc.)

Identification is performed on the basis of matching the first and successive characters of the input with a specific form of symbol string. The input string is identified successively left to right, and as one identification is made, the portion identified is extracted and tagged, and the identifier then works on the first and successive characters remaining in the input string. Tests for certain classes may be repeated twice, but they are not returned to later. Figure 1 shows the flow chart of the test sequence. The particular tests are described here subsequently.

The identification method seeks a predictable order of items, and when it correctly identifies these items, as it generally does, the resulting item partitioning is itself usually sufficient for determining column content. When identification is correct and the item is overly long, the identification helps in determining its final format. When a first unruly item is detected, the whole call number is assumed unruly and this and successive items are placed in class 7 ("other"), and further partitioning may be necessary.

The following definitions are used, defined via Backus conventions. Non-primitives are enclosed in triangular brackets, the vertical bar means "or" and the overbar means "not".

<character> :: = <alpha> | <numeric> |<punctuation>|
<space>

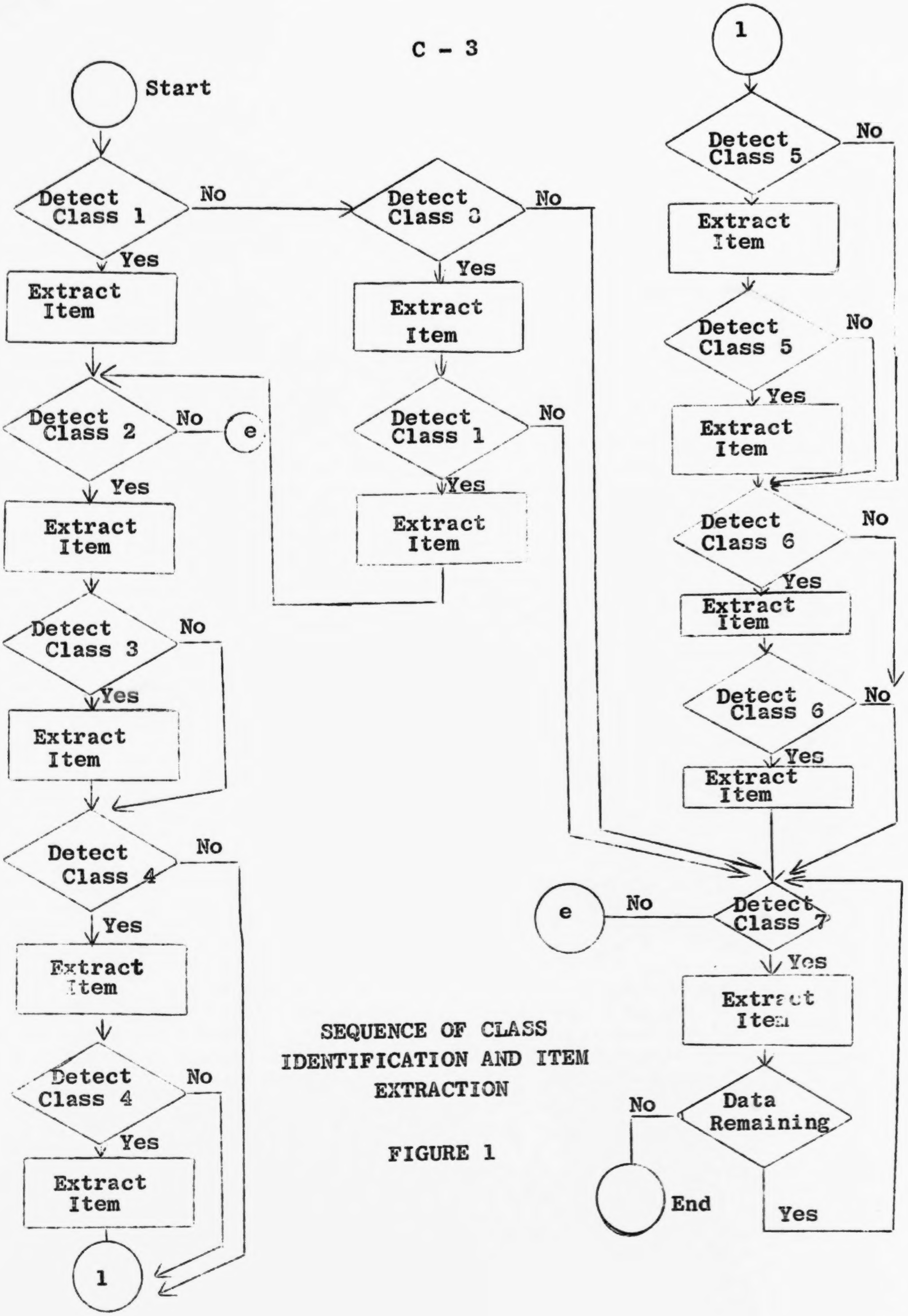
<alpha> : =<α> : = A|B|C|... |Z |a |b |c |...|z|

<numeric> : = <η> : = 0|1|2|....|9|

<space> : =<□>

<punctuation>: =<p>: = |<slash>|<comma>|<period>|<hyphen>|
<other code>

<end of call number>: =<e >:= as determined by format and context


Start
Detect Class 1
No
Yes
Extract Item
Detect Class 2
No
e
Yes
Extract Item
Detect Class 3
No
Yes
Extract Item
Detect Class 4
No
Yes
Extract Item
Detect Class 4
No
Yes
Extract Item
1
Detect Class 8
No
Yes
Extract Item
Detect Class 1
No
Yes
Extract Item
1
Detect Class 5
No
Extract Item
Detect Class 5
No
Yes
Extract Item
Detect Class 6
No
Yes
Extract Item
Detect Class 6
No
Yes
Extract Item
e
No
Detect Class 7
Yes
Extract Item
Data Remaining
No
End
Yes

SEQUENCE OF CLASS IDENTIFICATION AND ITEM EXTRACTION

FIGURE 1

<slash> : = /

<comma> : = ,

<period> : = .

<other code> : = $\overline{\langle c\rangle|\langle n\rangle|/|,|.|-}$

To define the identification criteria and specify the symbols to be extracted, we will require sequence operators. We use conventions similar to Kleene's, where each symbol is a defining sequence, or parenthetical expression in a defining sequence, represents a descrete and necessary occurrence. The following conventions apply:

$\alpha\beta$: = initial alpha immediately followed by beta

I : = Identical character (universal)

$\alpha I \beta$: = initial alpha immediately followed by another character immediately followed by beta.

$\alpha\beta^{\nu}\alpha$: = initial alpha immediately followed by ν betas immediately followed by alpha.

$\alpha\beta^{*}\alpha$: = initial alpha immediately followed by zero or more successive betas immediately followed by alpha, e.g., $\alpha\alpha$ or $\alpha\beta\alpha$ or $\alpha\beta\beta\beta\alpha$, etc.

$\alpha^{*}\beta$: = $\beta\,|\,\alpha\beta\,|\,\alpha\alpha\beta\,|$ ...etc.

$\alpha\bar{\beta}$: = initial alpha immediately followed by a character not beta

$\alpha(\beta|\gamma)$: = initial alpha immediately followed by a character either beta or gamma.

ψ : = null character

$(\alpha|\psi)\beta\gamma$: = $\alpha\beta\gamma|\beta\gamma$: = initial character may be γ or β, followed respectively by $\beta\gamma$ and γ.

The identifying sequences, and extracted sequences are shown in Figure 2. In operation, the first character of the input string and its following symbols (or the first character of the input string after the last extracted item) must exactly match the class specification sought in the program flow of Figure 1. When a match is obtained, a portion of the matched data is extracted, as specified in the extraction list (Figure 2). Progressing through the flow of Figure 1, the next sought-for class

Class	Identity Starting with First Remaining Character	Characters Extracted from Identified Portion
1	$\alpha\alpha^*\eta$	$\alpha\alpha^*$
2	$\eta\eta^*(\bar{\eta}\mid e)$	$\eta\eta^*$
3	$\cdot\eta\eta^*(\cdot\mid\alpha\mid e)$	$\eta\eta^*$
4	$(\cdot\mid\psi)\alpha\alpha^*\eta^*(\bar{\eta}\mid e)$	$\alpha\alpha^*\ \eta^*$
5	$p^*\square\ \eta^4$	η^4
5a	$(\alpha\mid\alpha^2)\ (\square\mid e)$	$\alpha\alpha^*$
6	$p^*\alpha\alpha^*(p\mid p\square\mid\Psi)\eta\eta^*(\bar{\eta}\mid e)$	$\alpha\alpha^*(p\mid p\square\mid\psi)\eta\eta^*(-\mid\psi)$
7	$p^*\bar{p}\ I^*(\square\mid e)$	$-\ \bar{p}\ I^*$
8	$\alpha\alpha^*(p\mid\psi)\square$	$\alpha\alpha^*$

Item Classes, Identifying Sequences, and Characters Extracted.

FIGURE 2

specification is matched against the input character string starting with the character after the last extracted character. What we are doing, in brief, is identifying an item in terms of its possible forms and necessary pre-and post-delimiters, and then extracting the item only.

Item 6 will serve as an illustration for the rest, which are simpler. We identify a class 6 item by a sequence consisting of zero or more punctuation characters; one or more alpha characters, either punctuation, or punctuation space, or if neither of these exist then the character specification is null and the considered input symbol must match the next specification symbol; one or more numeric characters; an end of record or character not numeric. When this specified sequence is found, the extracted portion of it consists of the sequence less initial punctuation, if any, and through the final numeric portion, including at the end a hyphen if such should exist as the terminating $\bar{n}$ character.

The remaining 7 items are considerably simpler. As each item is identified and extracted, it is put in a list and identified with a class label. Successive items of the same class are kept discrete, and appropriately labelled. The item lists resulting are illustrated for the examples in pages C8 - C13 of this memo.

2.2 Division

Items in the list are then examined for length, and where items exceed 6 characters they are divided into 2 items of the same class. Rules for division are somewhat class-dependent, but use subsets of the same rules in the same order.

2.2.1 Rules

Rule 1: Start with 7th character and work back to 1st character, and break on first encountered space. If none, repeat and look for slash, if none repeat and look for comma. When a break point is found eliminate the space, slash, or comma from the item, and carry the remainder of the item forward as a new item of the same class.

Rule 2: Check if item begins α^7, if so replace 6th symbol with a hyphen and make new item from symbol 6 onward.

Rule 3: Check if item begins $\alpha\alpha^*._*nn^*\bar{n}$ and if so check if portion $\alpha\alpha^*.nn^*$ is 6 characters, if so, make a new item starting with $\bar{n}$. If portion $\alpha\alpha^*.nn^*$ is less than 6 characters, check if $\bar{n}$: = hyphen and begin new item with character after $\bar{n}$ if so, or with $\bar{n}$ if not so.

Rule 4: Check from 7th character back for p symbol not period, if found, break, dropping the p symbol. If not found repeat and look for period, if found, break dropping the period unless it was preceeded by an ∂ character.

Rule 5: Break after 6th character.

The rules are applied in the above order when an item is to be split. Rule 3 is only used in splitting items of classes 4, 6, 7 and 8. Rule 2 is only used for classes 7 and 8. However, no harm is done by applying these rules without exception to items of all classes - it is merely a waste of time. The exigencies of program construction can determine the preferred method.

2.3 Concatenation

After identification and division have been performed, one or two very short items may exist that are properly combined. Application of the following rules provides this:

Rule 6: Check if successive items of class 2 and class 3 both exist, if so, add a period after the class 2 item add concatenate the class 3 item if the total is 6 characters or less.

Rule 7: Check for class 7 item with single character, concatentate into preceeding class 4 or class 7 item, if such exists and total character length does not exceed 6.

Rule 8: Check continguous class 7 - class 7 pairs, and concatenate with intervening space if total does not exceed 6 characters.

3. CONCLUSIONS

The algorithm presented is a multiple pass process and the same rules could probably be incorporated into a single pass system, at no loss in accuracy and no necessary gain in simplicity. The algorithm does not result in a simple program. It works on 45 difficult examples. Simpler solutions should be tested on the same examples. Additional difficult examples should be tested with this algorithm.

W. R. Nugent

W. R. Nugent

tmd

Examples of Algorithmic Call Number Division

1.
QL678.A45

Class	Items	Format
1	QL	same
2	678	
4	A45	

2.
HF5548.2.A72

Class	Items	Format
1	HF	HF
2	5548	5548.2
3	2	A72
4	A72	

3.
HF5548.276A72

Class	Items	Format
1	HF	HF
2	5548	5548
3	276	.276
4	A72	A72

4.
Z7164.E2A57

Class	Items	Format
1	Z	same
2	7164	
4	E2	
4	A57	

5.
E467.1.A2A15

Class	Items	Format
1	E	E
2	467	467.1
3	1	A2
4	A2	A15
4	A15	

6.
HF1456 1964.C6

Class	Items	Format
1	HF	same
2	1456	
5	1964	
6	C6	

7.
BS191.A1.1952.N4

Class	Items	Format
1	BS	BS
2	191	191
4	A1	A1
7	1952.N4	1952
		N4

8.
JX636 1892 1955, no.21

Class	Items	Format
1	JX	same
2	636	
5	1892	
5	1955	
6	no.21	

9.
GA408 1751.F7M3

Class	Items	Format
1	GA	same
2	408	
5	1751	
6	F7	
6	M3	

10.
RD31.A425 1965

Class	Items	Format
1	RD	same
2	31	
4	A425	
5	1965	

11.
QK647.A35 1964c

Class	Items	Format
1	QK	
2	647	same
4	A35	
5	1964c	

12.
JX1975.A49 1923hd

Class	Items	Format
1	JX	
2	1975	same
4	A49	
5	1923hd	

13.
J87.M4 1958g no.2988

Class	Items	Format
1	J	J
2	87	87
4	M4	M4
5	1958g	1958g
6	no.2988	no. 2988

14.
QK1.U5 vol.35,pt.6

Class	Items	Format
1	QK	
2	1	
4	U5	same
6	vol.35	
6	pt.6	

15.
Q11.P6 N.S.,vol.55pt.3

Class	Items	Format
1	Q	Q
2	11	11
4	P6	P6
7	N.S.,vol.55pt.3	N.S. vol.55 pt.3

16.
D1.T68 t.14,zesz.4

Class	Items	Format
1	D	
2	1	
4	T68	same
6	t.14	
6	zesz.4	

17.
DA25.B5 [no.15]

Class	Items	Format
1	DA	
2	25	same
4	B5	
6	no.15	

18.
E51.H337 vol.57/no.1.

Class	Items	Format
1	E	
2	51	
4	H377	same
6	vol.57	
6	no.1	

19.
Z733.C531J

Class	Items	Format
1	Z	Z
2	733	733
4	C531	C531J
7	J	

20.
Z696.U5H 1959

Class	Items	Format
1	Z	Z
2	696	696
4	U5	U5H
7	H	1959
7	1959	

21.
HJ9013.C6b

Class	Items	Format
1	HJ	HJ
2	9013	9013
4	C6	C6b
7	b	

22.
PR2750.B_{o}7 1958

Class	Items	Format
1	PR	
2	2750	
4	B_{o}7	same
5	1958	

23.
PZ3.C3983Br

Class	Items	Format
1	PZ	
2	3	
4	C3983	
7	Br	

24.
PZ3.C4637Cas2

Class	Items	Format
1	PZ	
2	3	
4	C4637	same
6	Cas2	

25.
PZ3.D89Th 80

Class	Items	Format
1	PZ	PZ
2	3	3
4	D89	D89
7	Th	Th 80
7	80	

26.
PZ3.C86153Ghfc 2

Class	Items	Format
1	PZ	PZ
2	3	3
4	C86153	C86153
7	Ghfc	Ghfc 2
7	2	

27.
PZ7.B4656Wav

Class	Items	Format
1	PZ	
2	7	
4	B4656	same
7	Wav	

28.
PZ8.S38An

Class	Items	Format
1	PZ	
2	8	
4	S38	same
7	An	

29.
PZ8.1.H75IWat

Class	Items	Format
1	PZ	PZ
2	8	8.1
3	1	H75
4	H75	IWat
7	IWat	

30.
PZ10.3.S837No

Class	Items	Format
1	PZ	PZ
2	10	10.3
3	3	S837
4	S837	No
7	No	

31.
PZ10.3.D632Lad4

Class	Items	Format
1	PZ	PZ
2	10	10.3
3	3	D632
4	D632	Lad4
6	Lad4	

32.
JX1977.A2 E/3111,etc.

Class	Items	Format
1	JX	
2	1977	same
4	A2	
6	E/3111	
7	etc.	

33.
JX1977.A2 E/CN.6/341/rev.1

Class	Items	Format
1	JX	JX
2	1977	1977
4	A2	A2
7	E/CN.6/341/rev.1	E/CN.6
		341
		rev.1

34.
ML29c.M5 (music)

Class	Items	Format
1	ML	
2	29	same
7	c.M5	

35.
G3701s.C5 var.U5 (map)

Class	Items	Format
1	G	
2	3701	same
7	s.C5	
7	var.U5	

36.
Microcard PS3545.Y45

Class	Items	Format
0	Microcard	Micro-
1	PS	card
2	3545	Ps
4	Y45	3545
		Y45

37.
Microfilm 01104 no.93-94 AP

Class	Items	Format
0	Microfilm	Micro-
7	01104	card
7	no.93-94	01104
7	AP	no.93-
		94
		AP

38.
Microfilm 01291 reel 63, no.1E

Class	Items	Format
0	Microfilm	Micro-
7	01291	film
7	reel	01291
7	63	reel
7	no.1E	63
		no.1E

39.
Incun. 1494.L3 Rosenwald Collection

Class	Items	Format
0	Incun.	Incun.
7	1494.L3	1494
7	Rosenwald	L3
7	Collection	Rosen-
		wald
		Colle-
		ction

L.C.1
JX1977.A2 St/SOA/40

Class	Items	Format
1	JX	JX
2	1977	1977
4	A2	A2
7	St/SOA/40	St/SOA
		40

L.C.2
UG633.A3763 no.62-5 1960

Class	Items	Format
1	UG	
2	633	
4	A3763	
6	no.62-	same
7	5	
7	1960	

L.C.3
J85 1951. C9j 82d,1st no.17

Class	Items	Format
1	J	J
2	85	85
5	1951	1951
6	C9	C9j
7	j	82d
7	82d,1st	1st
7	no.17	no.17

L.C.4
DT333.S34 47.Jahrg.,Heft Nr.8

Class	Items	Format
1	DT	DT
2	333	333
4	S34	S34
7	47.Jahrg.,Heft	47
7	Nr.8	Jahrg.
		Heft
		Nr.8

L.C.5
Z2407.B no.32, etc.

Class	Items	Format
1	Z	
2	2407	same
7	B	
7	no.32,	
7	etc.	

L.C.6
BX2264.M56 1565 Rosenwald Coll.

Class	Items	Format
1	BX	BX
2	2264	2264
4	M56	M56
5	1565	1565
7	Rosenwald	Rosen-
7	Coll.	wald
		Coll.

Variations with respect to model examples in Ann Curran's TM-233

(8)	JX 636 1892 1955 no.21	example shows "1955," though final commas are missing in both example and algorithmic versions in the case of nos. 14 and 16 -- difference assumed trivial.
(17)	DA 25 B5 no.15	example includes dropped indentures "[no.15]". -- difference assumed trivial.
(18)	E 51 H337 vol.57 no.1	example has "vol.57/" slash conveys no information --difference assumed trivial.
(31)	PZ 10.3 D632 Lad4	example has "Lad 4", though input sequence has no space -- difference assumed trivial.

APPENDIX D

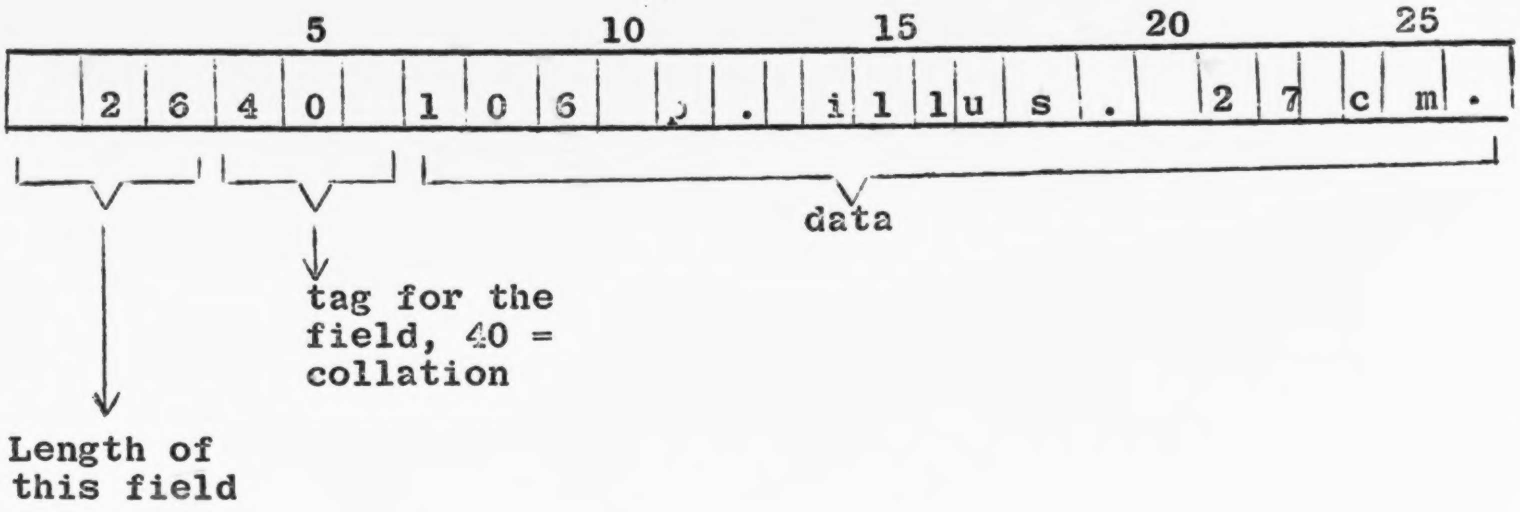
Analysis of the MARC II Format

The MARC II report defines format as "the structure, content, and coding of a record. The structure will provide the framework for incorporating both fixed and variable length fields within the record. The content is the data recorded in these fields. The coding is the machine representation of the character set."[1]

Another significant characteristic of machine formats, in addition to the structure, content, and coding, is the identification of the data in the record. In this appendix the structure, content, and identification of data in the MARC I and MARC II formats will be compared. The implications that the changes in the MARC II format have on the NELINET processing of Library of Congress data and the generation of its own cataloging records will also be noted.

Structure

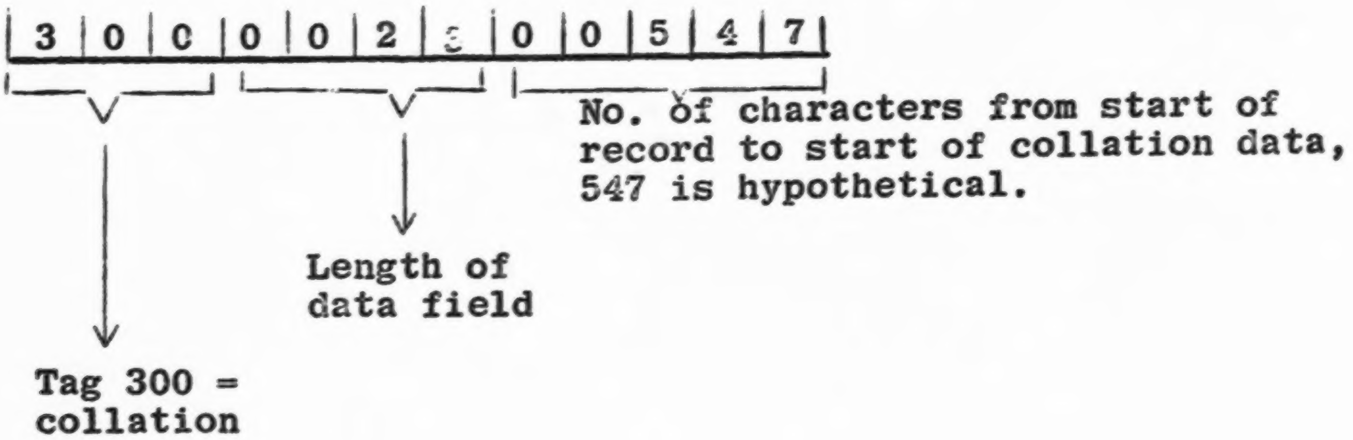
The MARC I format contains a fairly long fixed length field followed by a number of variable length fields. Each variable field contains a logical segment of the catalog card data preceded by six characters which contain the length of the field and the identifying tag for the field. The collation statement for a book would be found in the record as:


5
10
15
20
25
2 6 4 0 1 0 6 p . i l l u s . 2 7 c m .
data
tag for the field, 40 = collation
Length of this field

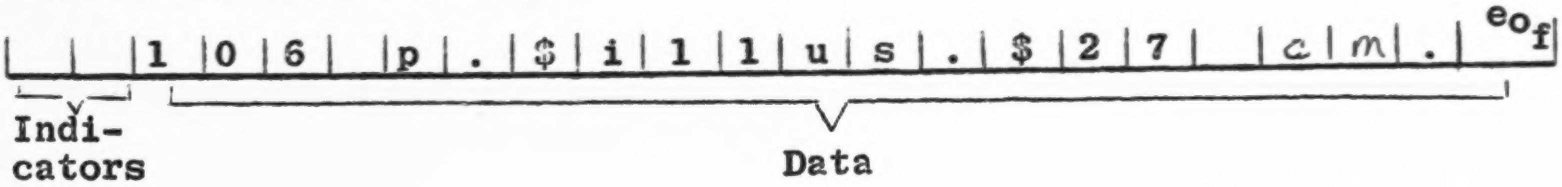
---

[1] Avram, Henriette D., Knapp, John F. and Rather, Lucia J., The MARC II Format. A Communications Format for Bibliographic Data. Preliminary Edition. Washington, Library of Congress, December, 1967.

The MARC II format consists of three parts - the leader, the directory, and the data fields. (See Figure D-1.) The leader is a short fixed length field which contains certain information about the machine record. The directory is made up of fixed length fields containing the identifying tag, the length of the corresponding data field, and its starting position relative to the beginning of the record. The data fields may be of fixed or variable length. The first two characters of each data field are alloted to indicators which further identify or describe the data field. In a MARC II record the collation data in the above example would appear in the directory as:


3 0 0 0 0 2 3 0 0 5 4 7
No. of characters from start of record to start of collation data, 547 is hypothetical.
Length of data field
Tag 300 = collation

and in the data field as:


1 0 6 p . $ i l l u s . $ 2 7 c m .
eof
Indicators
Data

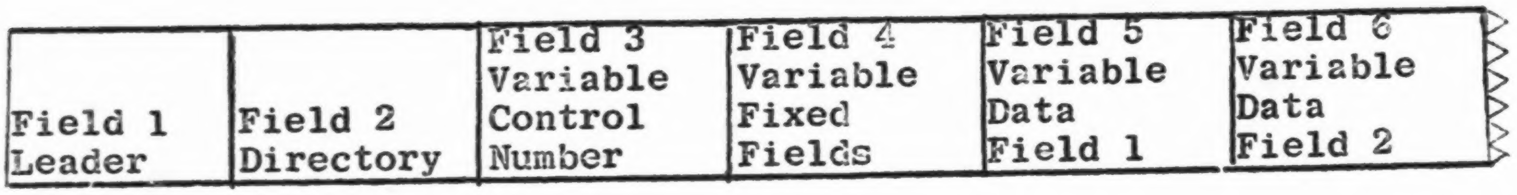
($=delimiter, a non printing separator of subfields)

(eof = end of field mark)

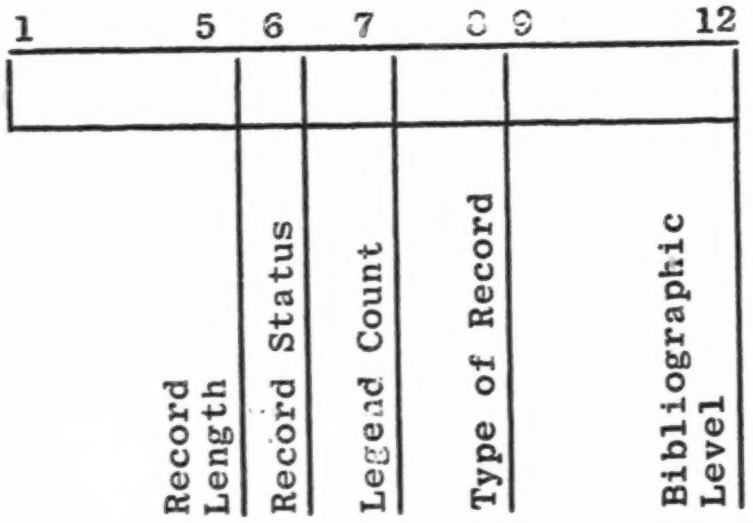
The NELINET format consists of two parts - the directory (map) and the data. Each entry in the directory is of fixed length and contains an identifying tag for a field (item) in the data and the position of the first character of the field relative to the beginning of the data. Data fields can be of fixed or variable length.

The structure of the MARC II format is more similar to NELINET than was MARC I. As far as structure is concerned, MARC II and NELINET are highly compatible, both being "mapped" records.

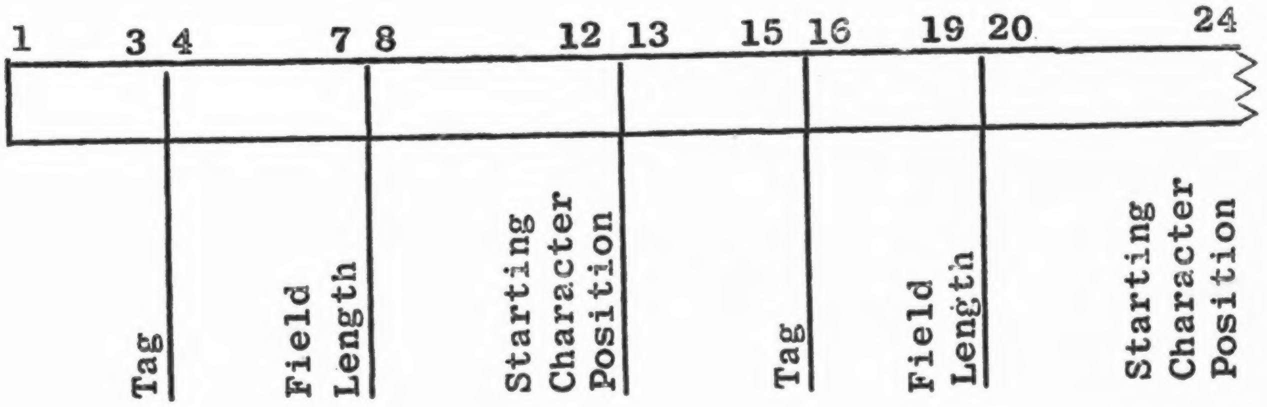
MARC II - Tape Structure


Field 1
Leader
Field 2
Directory
Field 3
Variable
Control
Number
Field 4
Variable
Fixed
Fields
Field 5
Variable
Data
Field 1
Field 6
Variable
Data
Field 2

Leader


1
5
6
7
8
9
12
Record Length
Record Status
Legend Count
Type of Record
Bibliographic Level

Directory


1
3
4
7
8
12
13
15
16
19
20
24
Tag
Field Length
Starting Character Position
Tag
Field Length
Starting Character Position

Variable Data Field

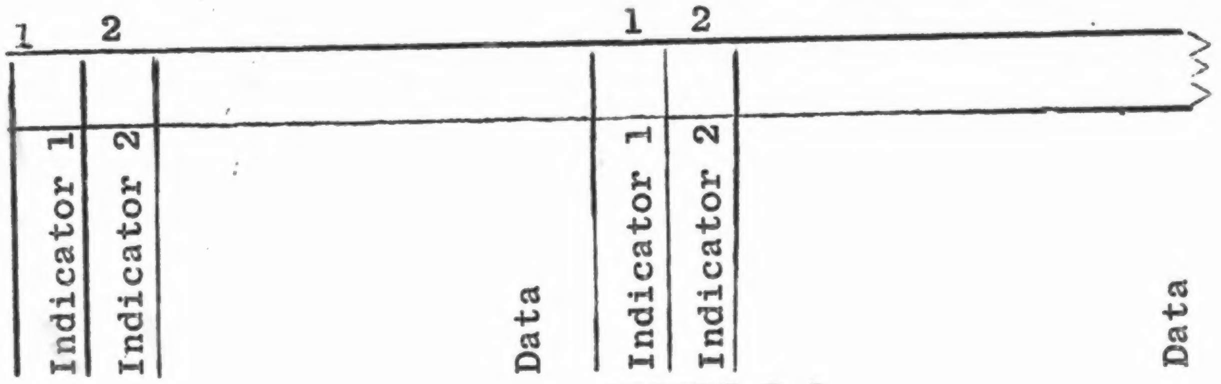

1
2
1
2
Indicator 1
Indicator 2
Data
Indicator 1
Indicator 2
Data

FIGURE D-1

Content

Very little MARC I data has been eliminated from the MARC II format. The codes for publisher and city of publication are not included but have been replaced by the publisher's prefix in the Standard Book Number and the country of publication code respectively. The code to indicate that a work is a grammar has been omitted.

A considerable amount of new data has been added to the MARC II record. Some of this new information is contained as codes and indicators in the variable fixed field, Tag 001, and some is contained as new variable data fields, e.g., the National Library of Medicine Call Number. An itemized listing of the MARC II fixed and variable fields along with an indication of the new fields not in MARC I are presented in Table D-1.

Identification of Data

In the MARC II format many of the data fields are more precisely identified and described than they were in MARC I. Most of these additional distinctions are made to facilitate machine filing according to the Library of Congress filing rules. The distinctions among personal, corporate, and conference name entries as well as those indicating filing treatment for personal and corporate name added entries greatly increase the number of different tags in the MARC II format. The fixed and variable fields which are identified differently in MARC II than they were in MARC I are shown in Table D-1.

Table D-1 lists the data elements identified by position in the fixed field and by a tag given to a variable field. In the MARC format data elements within a variable field are also identified. Usually a special character called a delimiter separates the subfields contained within a field. A personal name entry, for example, may contain four subfields - name, title, identifier, and relator. Unlike MARC I, MARC II indicates vacant subfields. The changes in internal identification within tagged fields are shown in Table D-2.

Implications for the NELINET Processing Center Programming

The changes in the MARC II format will mean almost total reprogramming of the card production programs. In addition to the new data in MARC II and the differences in identification of data there are other changes in the MARC II record which will require extensive changes in the programs. Title added entries are specified by an indicator in the title statement field rather than by a separate tag as they were in MARC I. Series entries in which the author of the series is the main entry are to be generated by combining the main entry with the last part of the series statement rather than from data in one field. Such techniques are better suited to a machine based system than were the practices of MARC I but will require considerable programming changes to accommodate them.

The decision has, therefore, been made to delay such reprogramming until MARC II has been firmly established and has been running for some time. This delay will also provide the opportunity of gaining more operating experience with the present programs to see how they might be improved. In order to provide continuous service after the Library of Congress changes to MARC II, a conversion program will be written which converts the Library of Congress MARC II data tapes to the NELINET MARC I format. These tapes can then be run through the existing card and label production programs and NELINET card production demonstration services need not be interrupted. The conversion from MARC II to NELINET master file format is a much simpler program to write than a new card production program and could be written before the Library of Congress starts to issue MARC II tapes in July, 1968.

Data Creation

The tagging of data for a MARC II record will be much more difficult than MARC I tagging. One would have less confidence in anyone but a trained cataloger doing or revising it. The distinctions made among personal and corporate name added entries to indicate filing treatment for instance, will require knowledge of the filing rules. Identifying personal names as forename or surname entries will at times be difficult especially when dealing with foreign names. Distinguishing geographic names from political jurisdictions will sometimes be difficult as will determining some period subdivisions. More time will be required to tag the record; more time will be required to train people to tag properly; more errors can be expected in the tagging; and more correction time will be required before "clean" records are obtained.

As originally planned, the six participating libraries would send original cataloging or Library of Congress non-MARC cataloging to the center and the center would tag and key it. Some of the tags in the MARC II format would be difficult to assign apart from the cataloging process. Such tags are:

(1) The main entry is the publisher. (The publisher is omitted on the catalog card both when it is the main entry and when it is unknown.)

(2) The language of the original and the language from which the work was translated. (This also occurred with MARC I.)

(3) The book contains an index.

Since MARC II will become the standard format for the exchange of machine readable cataloging data among libraries, it is certainly desirable that others generating machine records use it. To do so will require considerable time and sophistication on the part of those who identify the items in the data. If the NELINET center is to generate complete MARC II records, it can only do so with help from the participating libraries.

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Leader
			Record Length
			Record Status, New
			Record Status, Changed
**			Record Status, Deleted
			Record Status, Old
**			Legend, Count
**			Legend, Type, Language Materials, Printed (A)
**			Legend, Type, Language Materials, Manuscript (B)
**			Legend, Type, Music, Printed (C)
**			Legend, Type, Music, Manuscript (D)
**			Legend, Type, Maps, Printed (E)
**			Legend, Type, Maps, Manuscript (F)
**			Legend, Type, Motion Pictures and Filmstrips (G)
**			Legend, Type, Microforms (H)
**			Legend, Type, Sound-Recordings, Language (I)
**			Legend, Type, Sound-Recordings, Music (J)
**			Legend, Type, Pictures (K)
**			Legend, Type, Computer Mediums, (L)
**			Legend, Type, Authority Data-Names (X)

* Data
** New

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Leader (continued)
**			Legend, Type, Authority Data-Subjects (Y)
**			Legend, Bibliographic Level, Analytical
			Legend, Bibliographic Level, Monographic
			Legend, Bibliographic Level, Serial
**			Legend, Bibliographic Level, Collective
**			Directory
			Tag
			Field Length
**			Starting Character Position
	000		Variable Control No.
			LC Card No. (Prefix, Year, Serial No.)
**			LC Card No. Check Digit
			LC Card No. Supplement No.
			LC Card No. Suffix
	001		Variable Fixed Field
**			No. of Entries in Directory
**			Date Entered on File (Day, Mo., Yr.)
			Type of Publication Date, Single (S)
**			Type of Publication Date, Copyright (C)

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fixed Field (continued)
			Type of Publication Date, Not Known (N)
			Type of Publication Date, Reprint (R)
			Type of Publication Date, Multiple (M)
			Type of Publication Date, Questionable (Q)
			Date 1
			Date 2
**			Country of Publication Code
			Illustration Code - Illustration (A)
			Illustration Code - Maps (B)
**			Illustration Code - Portraits (C)
**			Illustration Code - Charts (D)
**			Illustration Code - Plans (E)
**			Illustration Code - Plates (F)
**			Illustration Code - Music (G)
**			Illustration Code - Coats of Arms (I)
**			Illustration Code - Genealogical Tables (J)
**			Illustration Code - Forms (K)
			Intellectual Level Code (Juvenile)
**			Form of Microreproduction Code, Microfilm (A)

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fixed Field (continued)
**			Form of Microreproduction Code, Microfiche (B)
**			Form of Microreproduction Code, Microopaque (C)
			Form of Content Code, Bibliographies (A)
**			Form of Content Code, Catalogs (B)
**			Form of Content Code, Indexes (C)
**			Form of Content Code, Abstracts (D)
			Form of Content Code, Dictionaries (E)
**			Form of Content Code, Encyclopedias (F)
**			Form of Content Code, Directories (G)
**			Form of Content Code, Yearbooks (H)
**			Form of Content Code, Statistics (I)
**			Form of Content Code, Handbooks (J)
**			Government Publication Indicator
			Conference Publication Indicator
**			Festschrift Indicator
**			Index Indicator
*			Main Entry in Body of Entry Indicator
**			Fiction Indicator

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fields
**	002		Legend Extension
	003	0	Language(s) - Non Translation
	003	1	Language(s) - Translation
	010		LC Card No.
	011		National Bibliography No.
**	012		Standard Book No.
**	013		PL 480 No.
**	014		Search Code
**	019		Local System No.
**	020		BNB Classification No.
	030		Dewey Decimal Classification No.(s)
	050	0	LC Call No.
	050	1	LC Call No. - Book not in LC
	051		Copy Statement
**	060		NLM Call No.
**	070		NAL Call No.
**	071		NAL Subject Category No.
**	080		Universal Decimal Classification No.
**	090		Local Call No.

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Elements
			Variables Fields (continued)
			Main Entry
*	100	0	Personal, Forename
*	100	1	Personal, Single Surname
*	100	2	Personal, Multiple Surname
*	100	3	Personal, Name of Family
**	100	4	Personal, Forename, is Subject
**	100	5	Personal Single Surname, is Subject
**	100	6	Personal, Multiple Surname, is Subject
**	100	7	Personal, Name of Family, is Subject
*	110	0	Corporate, Surname
*	110	1	Corporate, Place
*	110	2	Corporate, Name (Direct Order)
**	110	4	Corporate, Surname, is Subject
**	110	5	Corporate, Place, is Subject
**	110	6	Corporate, Name (Direct Order), is Subject
*	111	0	Conference, Surname
*	111	1	Conference, Place
*	111	2	Conference, Name (Direct Order)
**	111	4	Conference, Surname, is Subject
**	111	5	Conference, Place, is Subject

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fields (continued)
			Main Entry (continued)
**	111	6	Conference, Name (Direct Order), is Subject
*	120	0	Corporate with Form Subheading
**	120	1	Corporate with Form Subheading, is Subject
	130	0	Uniform Title
**	130	1	Uniform Title, is Subject
	200	0	Title ("Uniform," "Conventional," or "Filing")
**	200	1	Title ("Uniform," "Conventional," or "Filing") is on LC Printed Cards
**	210	0	Romanized Title
**	210	1	Romanized Title, Receives Title Added Entry
**	220		Translated Title
	240	0	Title Statement
*	240	1	Title Statement Receives Added Entry
	250		Edition Statement
	260		Place(s)
	261	0	Publisher
**	261	1	Main Entry is Publisher
	262		Date(s)
	300		Collation
	350		Bibliographic Price
**	360		Converted Price

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Elements
			Variable Fields (continued)
			Series, Traced,
*	400	0	Personal, Forename
*	400	1	Personal, Single Surname
*	400	2	Personal, Multiple Surname
*	400	3	Personal, Name of Family
**	400	4	Personal, Forename, is Main Entry
**	400	5	Personal, Single Surname, is Main Entry
**	400	6	Personal, Multiple Surname, is Main Entry
**	400	7	Personal, Name of Family, is Main Entry
*	408		Personal, Title
*	410	0	Corporate, Surname
*	410	1	Corporate, Place
*	410	2	Corporate, Name (Direct Order)
**	410	4	Corporate, Surname, is Main Entry
**	410	5	Corporate, Place, is Main Entry
**	410	6	Corporate, Name (Direct Order), is Main Entry
*	411	0	Conference, Surname
*	411	1	Conference, Place
*	411	2	Conference, Name (Direct Order)
**	411	4	Conference, Surname, is Main Entry

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Date Element
			Variable Fields (continued)
			Series, Traced,
**	411	5	Conference, Place, is Main Entry
**	411	6	Conference, Name (Direct Order), is Main Entry
*	418		Corporate, Title
	440		Title
	490	0	Series, Untraced
*	490	1	Series, Untraced, Series is Traced Differently
*	500		Bibliography Note
*	510		Dissertation Note
*	520		Contents Note (Formatted)
*	530		"Bound With" Note
*	540		"Limited Use" Note
*	550		General Notes (All Others)
**	560		Annotation or Abstract
			Subject Entry
*	600	0	Personal, Forename
*	600	1	Personal, Single Surname
*	600	2	Personal, Multiple Surname
*	600	3	Personal, Name of Family

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fields (continued)
			Subject Entry
*	608		Personal, Title
*	610	0	Corporate, Surname
*	610	1	Corporate, Place
*	610	2	Corporate, Name (Direct Order)
*	611	0	Conference, Surname
*	611	1	Conference, Place
*	611	2	Conference, Name (Direct Order)
*	618		Corporate, Title
*	620		Corporate, Name with Form Subheading
*	628		Corporate, Name with Form Subheading, Title
*	630		Uniform Title
*	650		Topical
*	651		Geographic Name
*	652		Political Jurisdiction
*	653		Proper Names, Not Capable of Authorship
*	655		General Subdivision
*	656		Period Subdivision
*	657		Place Subdivision
**	660		NLM (MeSH) Heading
**	661		NLM (MeSH) Heading, Topical Subheadings

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fields (continued)
			Subject Entry
**	662		NLM (MeSH) Heading, Geographical Subheadings
**	663		NLM (MeSH) Heading, Period Subheadings
**	664		NLM (MeSH) Heading, Form Subheadings
**	670		NAL Agricultural/Biological Vocabulary
**	690		Local Subject Heading
			Added Entry
*	700	@	Personal, Forename, Alternative
*	700	A	Personal, Single Surname, Alternative
*	700	B	Personal, Multiple Surname, Alternative
*	700	C	Personal, Name of Family, Alternative
*	700	D	Personal, Forename, Secondary
*	700	E	Personal, Single Surname, Secondary
*	700	F	Personal, Multiple Surname, Secondary
*	700	G	Personal, Name of Family, Secondary
*	700	H	Personal, Forename, Analytical
*	700	I	Personal, Single Surname, Analytical
*	700	J	Personal, Multiple Surname, Analytical
*	700	K	Personal, Name of Family, Analytical
	708		Personal, Title

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Elements
			Variable Fields (continued) Added Entry
*	710	@	Corporate, Surname, Alternative
*	710	A	Corporate, Place, Alternative
*	710	B	Corporate, Name (Direct Order), Alternative
*	710	D	Corporate, Surname, Secondary
*	710	E	Corporate, Place, Secondary
*	710	F	Corporate, Name (Direct Order), Secondary
*	710	H	Corporate, Surname, Analytical
*	710	I	Corporate, Place, Analytical
*	710	J	Corporate, Name, (Direct Order), Analytical
*	711	@	Conference, Surname, Alternative
*	711	A	Conference, Place, Alternative
*	711	B	Conference, Name, (Direct Order), Alternative
*	711	D	Conference, Surname, Secondary
*	711	E	Conference, Place, Secondary
*	711	F	Conference, Name, (Direct Order), Secondary
*	711	H	Conference, Surname, Analytical
*	711	I	Conference, Place, Analytical
*	711	J	Conference, Name, (Direct Order), Analytical
	713		Corporate, Title

TABLE D-1

MARC II - Identification of Fields

Status	Tag	Ind.	Data Element
			Variable Fields (continued)
			Added Entry
*	720	0	Corporate, with Form Subheading, Alternative
*	720	1	Corporate, with Form Subheading, Secondary
*	720	2	Corporate, with Form Subheading, Analytical
*	728		Corporate, with Form Subheading, Title
*	730	0	Uniform Title, Alternative
*	730	1	Uniform Title, Secondary
*	730	2	Uniform Title, Analytical
	740		Title Traced Differently
*	753		Proper Names Not Capable of Authorship
			Series Added Entry
*	800	0	Personal, Forename
*	800	1	Personal, Single Surname
*	800	2	Personal, Multiple Surname
*	800	3	Personal, Name of Family
*	808		Personal, Title
*	810	0	Corporate, Surname
*	810	1	Corporate, Place

TABLE D-1

MARC II - Identification of Fields

Status	Tag.	Ind.	Data Elements
			Variable Fields (continued)
			Series, Added Entry
*	810	2	Corporate, Name (Direct Order)
*	811	0	Conference, Surname
*	811	1	Conference, Place
*	811	2	Conference, Name (Direct Order)
*	818		Corporate, Title
	840		Title

5

TABLE D-2

MARC II - Internal Identification Within Tagged Fields

Status	Tag(s)	Data Element
	003	Language(s) of Work
**	003	Language Translated From
	003	Language of Original
**	003	Language(s) of Summaries
**	012	Standard Book Number--Publisher's Prefix
**	012	Standard Book Number--Title No.
**	012	Standard Book Number--Check Digit
**	030	More than 1 Dewey Decimal Classification No.
*	050	LC Call No.--Class No.
*	050	LC Call No.--Book No.
*	051	Copy Statement--Class No.
*	051	Copy Statement--Book No.
*	051	Copy Statement--Remainder
**	060	NLM Call No.--Class No.
**	060	NLM Call No.--Book No.
**	090	Local Call No.
**	090	Local Holding Collection Code
**	090	Local Number of Copies
	100,400,600 700,800	Personal Name Entries--Name
		Personal Name Entries--Title
		Personal Name Entries--Identifier
		Personal Name Entries--Relator

* Data Identified Differently
** New Data

TABLE D-2

MARC II - Internal Identification Within Tagged Fields

Status	Tag(s)	Data Element			
*	110,410,610		Name		Place
*	710,810	Corporate Entries	Subdivision	or	Name
*					Subdivision
*	111,411,611	Conference Entries--Name			
*	711,811	Conference Entries--No.			
*		Conference Entries--Place			
*		Conference Entries--Date			
*	120,620,720	Corporate Name With Form Subheadings--Name			
*		Corporate Name With Form Subheadings--Title			
	240	Title Statement--Short Title			
	240	Title Statement--Remainder of Title			
	240	Title Statement--Remainder to Edition			
	250	Edition Statement--Edition Information			
	250	Edition Statement--Remainder			
*	300	Collation--Pagination			
*	300	Collation--Illustrations			
*	300	Collation--Height			
**	300	Collation--Thickness			
*	408,418,448	Series--Title			
*	808,818,840	Series--Number			

APPENDIX E

PRODUCTION PROBLEMS AND DECISIONS

Soon after New Hampshire began receiving cards and labels they requested an opportunity to meet with Inforonics about problems they had encountered. On February 8, 1968, Inforonics personnel went to the NEBHE office in Durham to discuss the output products with the UNH catalogers. Listed are the problems, questions, etc. considered and the decisions on them reached during the meeting or subsequent to it. In some cases, a decision was postponed until the other participants have received and considered some cataloging products.

1. Typeface of labels: Other typefaces are being investigated.

2. Spacing:

    a. Before edition statement: No NEBHE standard, NELINET cards follow format of UConn, UMe, URI, and UMass, 2 spaces.

    b. Before imprint: No NEBHE standard, NELINET cards follow format of UConn, UMe, UMass, and UVt, 2 spaces.

    c. Within collation: Items are not separately identified on MARC tapes so no change is now feasible. NELINET libraries vary.

    d. Before series statement: No NEBHE standard, three libraries use 3 spaces and three use 2 spaces. NELINET cards will use 2, as, other things being equal, the saving of space seems desirable.

    e. Between tracing number and tracing data: No NEBHE standard, UConn, UMe, UMass and UVt leave one space, UNH leaves none. NELINET cards will have one space for the present. This space could be omitted if the libraries thought the space saved warranted it.

3. Blank lines:

    a. Before the first note: All libraries follow this practice. NELINET cards do not in order to conserve space. This could be changed.

    b. Before the tracings: Five libraries follow this practice (URI format unknown). NELINET cards do not in order to conserve space. This could be changed.

    c. Between the header data on card 2 and continuation of text: This blank line is now produced on the NELINET cards.

4. The BNB number which can be used to order BNB cards will no longer be printed on NELINET CARDS; in its place an abbreviation

of the requesting library will be printed to aid card distribution.

5. Oversize books: Libraries may encounter oblong books whose width requires they be shelved as an oversize volume though their spine length does not. Present programs will probably not handle them correctly; libraries should submit the local call number with their oversize symbol.

6. Errors in data such as Robart for Robert are due to mistakes in the L.C. tapes.

7. Partial title entries: Programs are being corrected to produce "catchword" titles.

8. Series tracings: Programs that produce overprinted series headings are being corrected. When local series entry practices differ from L.C. treatment, the library will have to adjust the cards or its practice.

9. Erratic indention of headings on card two's has been fixed.

10. Branch and special shelf location will appear over all call numbers for the present. This was agreed to by the six libraries at the meeting on May 24, 1967.

11. Author/title or title information repeated on card two's will be in L.C. format.

12. To reduce the frequency of card two's, line 14 will be made available to data and the continuation statement (Cont. next card) will be on the 15th line.

13. Tracings beginning on top line of the card: This is done to allow the maximum space for the tracings and is L.C. MARC practice. One could even assert it assists the catalog user to distinguish the heading data from the main entry.

14. Punctuation before a subject subdivision: MARC uses a double dash as do UConn and UVt. (UMass and UNH use space dash space and UMe uses a single space). To do other than follow MARC would require considerable effort, require more space and conform to the format of the same number of libraries.

15. Subject subdivision abbreviations: These are now spelled out.

16. It was suggested that in tracings "Title." and "Title:" be shortened to "T." and "T:" to save space. No NELINET libraries presently do so. The change, while fairly simple, seems best postponed until all the libraries have received some cards.

17. New Hampshire felt that inserting the cards and labels into envelopes was unnecessary. It will be suspended. If other libraries request it, resumption could be reconsidered.

18. Margins:

   a. Labels: a one space left margin will be used on labels.

   b. Cards:

      1. A one space margin to the left of the call number will be used.

      2. Programs presently produce cards with L.C. format, that is, the main entry begins to the left of all other lines. This means considerable wasted space as all subsequent lines begin at the second or third indention. Changes to bring cards closer to the formats of the NELINET libraries are being written. "Hanging indention" will be used for the title paragraph of anonymous works as on p. 65 of L.C. Colvin's Cataloging sampler. (cf. Cataloging Service bulletin no. 69 and AA rules footnote p. 192). Line endings will not be indicated for titles in verse, etc. as the MARC record does not provide for them (cf. AA rule 133).

19. L.C. call number: Present programs to divide the L.C. call number for labels and for the left margin (gutter) of the cards are imperfect.

   a. When the numeric part of the classification number is less than six characters long but includes a decimal point, the programs divide on the decimal which is contrary to NEBHE library practice and to the format specified in the Presentation notes for the May 24, 1967 NEBHE meeting.

   b. When a period is followed by a space, e.g., vol. 2, two carriage returns are executed resulting in a blank line between "vol." and "2".

   c. The decimal point is not being dropped before the book number as was also specified in the May 24, 1967 presentation notes.

   d. An algorithm to solve the problems of L.C. call number division has been developed by W. Nugent. Programming to incorporate it into the present programs has been postponed to allow manual testing of it. The present effect of the above problems should be small because "a" and "b" occur infrequently and "c" is not a problem until Rhode Island or Massachusetts begins requesting cards because New Hampshire presently retains the decimal point before the book number.

20. Title tracing: Present programs remove punctuation other than periods, question marks, and exclamation points from titles before using them as a heading. New Hampshire expressed the desire that a period appear at the end of all such headings. This programming is possible but has been postponed until other libraries have a chance to react to the cards.

21. Future problems: To enable Inforonics to assess and improve the quality of the products, New Hampshire will fill out problem reports for each new problem and annotate and return cards which are not usable. Both will be forwarded to R. Simmons. As soon as 7, 8, and 12 are solved, New Hampshire will resume requests.

APPENDIX F

OPERATING PROCEDURES FOR INFORMATION TRANSMITTAL IN THE NEW ENGLAND LIBRARY INFORMATION NETWORK

Prepared by
Robert H Simmons

October 18, 1967

OPERATING PROCEDURES FOR INFORMATION TRANSMITTAL IN THE NEW ENGLAND LIBRARY INFORMATION NETWORK

Installed at each of the participating libraries is a teletypewriter, model ASR-33. These teletypewriters will be used to transmit requests between the participating libraries and the NELINET central processing center. The requests will be for catalog cards, book spine labels, and book pocket labels, for the participating libraries and their branches.

The requesting procedures have been made as concise as possible to facilitate ease of use by the cataloger, and ease of transmittal by the transmitting clerk. Suggestions for easier methods are actively solicited.

NELINET Request Form

The NELINET Request Form is similar for each of the participating libraries. The area of deviation is the library code and the shelf list and branch name abbreviations. The request form will eventually have more information included in it as the demonstration period progresses into title and/or author searching.

A short explanation of each line follows. A more comprehensive explanation of each line is included in the section entitled "Cataloger's Procedures for Filling Out Request Sheets". We will use Figure 1, page 12 as an example work sheet.

RI	This will be preprinted on all Rhode Island library request sheets. This is a library identifier and will be transmitted with every request.
LC	This line is for Library of Congress call numbers. All requests for information will have this line filled in. At a later stage in the project this may not be known and appropriate author and title lines will be added.
AT	The next four lines in the sheet allows the user to specify where the books are destined to be sent, the number of copies, whether they are going onto a special shelf, and whether multivolume sets are involved.
CN	This line is available for libraries who wish to have a local call number placed on their cards and labels instead of the Library of Congress call number. This allows those participating libraries who use Dewey Decimal call numbers to use the system. This does not affect the normal procedure of getting the Library of Congress call number on the bottom of the catalog cards.

XC	"Xtra Cards" If the library wishes to have extra main entry cards produced above the normal set, then by writing in the amount this will be accomplished.
NCLP	"No Cards, Labels, Pockets" This is a multi-use line in that the library may suppress the production of catalog cards, spine labels, and book pockets, or any combination of the three outputs.

Cataloger Procedure for Filling Out the NELINET Request Form

Whenever a cataloger wishes to request catalog cards, book spine labels, and/or book pocket labels through the New England Library Information Network Processing Center he will have to complete a NELINET Request Form. This form has been made as short as possible and, we hope, as easy as possible to fill out. Part of the data has been preprinted on the forms to further facilitate fast and easy completion by the cataloger. A separate form has been created for each participating library differing only in the library code name and the listing of abbreviations of shelf list names and branch library names.

The request forms are to be filled out in the following way:

Line Name	
CO, MA, ME, NH, RI, or VT	This line is the library identifier. One of the previous state abbreviations will be preprinted on each of the request forms. No action needs to be taken by the cataloger as this will be transmitted by the teletype operator.
LC	The cataloger must enter the Library of Congress card number on this line. The cataloger is to write this number in the form in which it normally appears on L.C. cards. Example: 64-4302 HEW 66-2362
AT	This line, plus the next three lines, are provided for the cataloger to enter the location (copy is at....), copy-shelf statement and volume information. Some examples of how this information is to be filled out are given in pages 4 - 9.

CN	If the cataloger wishes to have a call number that is different from the Library of Congress call number then he may write this number on this line. This call number, referred to as a local call number, will then be placed in the left margin of all cards produced by this request. The local call number will also be used on all book spine labels, and book pocket labels produced by this request. If this line is not used, then the Library of Congress call number that appears on the bottom of the L.C. card will be automatically placed in the left margin of the catalog cards, and all labels produced by this request will contain the L.C. call number. Refer to page 10 for the proper way to write this number on the cards.
XC	If the cataloger wishes to have more than the normal amount of main entry cards (Xtra Cards) produced by the system for this request, the cataloger will write the extra amount he wishes in this space. This amount of extra main entry cards will be produced for this request in addition to the normal output.
NCLP	This line will be used by the cataloger if he wishes to prevent the output of catalog cards, book spine labels, and/or book pocket labels, (No Cards, Labels, Pockets). The cataloger must circle the C if cards are to be suppressed, the L if book spine labels are to be suppressed and/or the P if book pocket labels are to be suppressed.

This appendix will explain the proper way to fill out the location - copy shelf location, and volume statement. This line, which we will refer to as the technical process statement, or TPS, is used to produce the proper number of labels and select the correct profile for catalog cards. The TPS is made up of three separate parts:

1.	Location	This may be the branch abbreviation or the main library.
2.	Copy - shelf statement	The copy information and shelf location information is inserted in this section.
3.	Volume information	If the book consists of more than one volume they are noted in this section.

The parts are filled out in the following fashion:

1.	Location	The cataloger is to insert in this space the branch abbreviation or the word "main". Example 1: A request is made for the central library. Solution: Write main in the space marked "location". Example 2: A request is made for a branch library. Solution: Write the branch abbreviation in the space marked "location". Example 3: A request is made for both a branch location and the central library.

Solution:

Write main on the first line, and the branch abbreviation on the second line.

A semicolon must be placed between location and copy information. This indicates the end of the location section and the beginning of the copy - shelf statement section.

2. Copy-shelf statement

The cataloger is to insert in this space the copy information and the shelf abbreviation if applicable. The following examples are given as guides.

Example 1:

The cataloger requests cards for a single book and it is copy 1.

Solution:

The cataloger will write c.1 in the space provided.

Example 2:

The cataloger requests cards (and/or labels) for three books, copies 1, 2, and 3.

Solution: write|c.1-3

Meaning:

The "|" means to enumerate the information following the bar. The information supplied in this case meant the span covered was c.1, c.2, and c.3.

Example 3:

The cataloger requests labels for copies 1-4 of a book and copy 4 is to go to the reference section.

Solution: write|c.1-3, c.4 Ref

The bar (|) means to enumerate the following information (up to a comma) if more than one copy-shelf statement item is listed. The comma separates subparts of the copy-shelf statement c.4 Ref means the labels produced for copy 4 will have Ref printed on them.

Example 4:

The cataloger request labels for 5 books, 2 to go to reference, 1 to the central library and 2 to the Blatz collection.

Solution:

c.1, |c.2-3 Ref, |c.4-5 Blatz

If volume information is involved then a semicolon will be used to separate copy information from volume information.

3. Volume information

The cataloger is to insert volume information in this space if it is present. The following examples are given as guides.

Example 1:

A single volume is involved (assuming this is the first of several to be issued in a set).

Solution:

v.1

Example 2:

Two volumes, volumes 1 and 2 are involved.

Solution:

| v.1-2

As in the copy-shelf statement the bar (|) means to enumerate the information following, up to a comma, if one is present.

Example 3:

Two volumes are involved volumes 2 and 4.

Solution:

v.2, v.4

The comma separates subsections of the volume information part of the Technical Processing Statement.

Example 4:

Four volumes are involved volumes 1, 2, 3, and 5.

Solution:

|v.1-3, v.5

The bar signifies that the information following is to be enumerated. The comma ends the part to be enumerated.

Assume that the library wished to request processing cards for a single book. The statement will be the following:

AT □ MAIN

Note: c.1 does not have to be inserted if only 1 copy is present and no volume numbers are involved.

Assume the library wishes to request processing for the second copy of the above book at a later time.

AT □ main; c.2

Assume the library wishes to request processing for two copies of a book 1 and 2.

AT □ main; |c.1-2

for five copies, 1, 2, 3, 4, and 5

AT □ main; |c.1-5

The present copy span can be up to 99 copies.

Assume the library wishes to request processing for four copies, a replacement for copy one, which was destroyed and copies four, five, and six.

AT □ main; c.1, |c.4-6

If the copy one above was going to a shelf location, say reference, then the AT statement would look like this:

AT □ main; c.1 Ref, |c.4-6

Assume copy one was for the central library, copy two to four for the Ref collection, and copy five for the xyz shelf collection.

AT □ main; c.1, |c.2-4 Ref, c.5 xyz

Assume that on the above order two volumes v.1 and v.2 are involved.

AT □ main; c.1, | c.2-4 Ref, c.5 xyz; | v.1-2

Assume that only volume one is going to the xyz shelf location.

AT □ main; c.1, |c.2-4 Ref, |v.1-2

and

AT □ main; c.5 xyz; v.1

Assume copy 1 to main library

copy 2 to mathematics branch

copy 3 to reference collection.

AT □ main; c.1, c.3 Ref

and

AT □ MATH; c.2

Probably the most common request will be a single copy for a single location which will look like:

AT □ main

The following is an explanation of each character in an example statement.

Example:

AT□ main;|c.1-3, c.4 Ref;|v.1-3

AT□ = the prefix of the statement which allows the program to interpret the statement as a technical processing statement.

main = the location for which the request is made. Up to six characters may be entered in this space. If any entry is made other than the word 'main' the line will then be considered information for a Branch library and this location will appear on all output.

; = the semicolon separates the location information from the copy-shelf information.

| = the bar indicates that information following up to a comma or semicolon must be enumerated.

c.1-3 = the spread of copies to be enumerated.

, = separates the sub-parts of the statement.

c.4 Ref = the copy number and its shelf location. This automatically will be placed on all the catalog cards on labels produced for this copy number, (or numbers if it is to be enumerated).

; = separates the copy-shelf statement from the volume information.

| = enumerate the following volume information up to a comma or end of the statement.

v.1-3 = the spread of volumes to be enumerated.

A local call number or CN field on the request sheet is available for the libraries who wish to have a call number other than the Library of Congress call number on the spine labels, and the margin of catalog cards. This provision allows those libraries who are using the Dewey Decimal Call Number system or their own unique call numbering system to use the NELINET.

Certain arbitrary conventions are used to indicate upper case characters, but these conventions will only concern the transmittal clerk rather than the catalogers. The following are examples of formatting for local call numbers in this field and how the number will appear on the output medium.

Example 1:

574/.92074

Will look like:
547
.92074

The slash indicates the end of a line (it is interpreted as a carriage return). No more than six characters including punctuation may appear on a single line.

Example 2:

QP/481/.H4813

Will look like:
QP
481
.H4813

Example 3:

QL/478/.M25/1964

Will look like:
QL
478
.M25
1964

Sample Request Sheets

The following is a number of sample request sheets that have been filled in with request data.

In Figure 1, the library is requesting cards, spine labels and pocket labels for a single copy for the main library. The Library of Congress call number is filled in and under the Technical Processing Statement the word main has been entered. This is the minimum amount of information that can presently be entered to produce card sets, spine labels, and book pocket labels.

Figure 2 shows a request for cards and book pocket labels for 2 copies, one of which will be in the reference collection. The library has also requested one extra main entry card. Note that the L on the last line has been circled. This is done to indicate suppression of spine labels.

Figure 3 is an example of a request for catalog cards and spine labels for three copies, copies one and two are for the main library and copy three is for the Rhode Island collection shelf location. (c.3 R.I. CL) The library has also filled in the local call number line (CN□). This number will appear on all catalog cards and spine labels for this order. The P is circled to prevent pocket label production.

Figure 4 shows a request for catalog cards, book spine labels, and book pocket labels for three books, v.1 c.1 to the central library card v.1 c.2, v.2 c.2 to the NML branch library. Two groups of catalog cards will be produced for this request: group one will use the general library formats and group two will use the branch library formula. The spine labels and the margin area of the catalog cards for the branch (NML) request will be headed with the branch abbreviation in this case NML.

Figure 5 is a sample request for catalog cards and book spine labels for eight items consisting of copies 1-3 of volumes 2 and 3 for the central library, and copies 1-2 of volume 1 for the branch library called EXT. The library is also requesting that the local call number be used in margin of the card rather than the normally supplied L.C. call number. Two extra main entry cards have been requested and book pocket labels are not to be produced.

The following is an image of what each spine label would look like from this request (Figure 5).

824 .8 1964 v.2 c.1	824 .8 1964 v.2 c.2	824 .8 1964 v.2 c.3	824 .8 1964 v.3 c.1	824 .8 1964 v.3 c.2	824 .8 1964 v.3 c.3	EXT 824 .8 v.1 c.1	EXT 824 .8 v.1 c.2

NELINET Request Form

RI

LC ☐ 63-17953
L.C. Card Number

	Location	Copy-Shelf Statement	Volume
AT ☐	MAIN		
AT ☐			
AT ☐			
AT ☐			

CN ☐ __________
Local Call Number

XC ☐ __________
Extra Main Entry Cards

N CLP
No Cards Labels Pockets

Branches

- NML
- GLS
- EXT

Shelf Locations

- Rare
- R.I.Cl
- J.F.K.
- Blatz
- Ref
- Juv.
- Archiv
- Thesis
- mfilm
- mcard
- mfiche

FIGURE 1

NELINET Request Form

RI

LC ☐ 63-17953
L.C. Card Number

	Location	Copy-Shelf Statement	Volume
AT ☐	MAIN	; C.1, C.2 Ref	
AT ☐			
AT ☐			
AT ☐			

CN ☐
Local Call Number

XC ☐ 1
Extra Main Entry Cards

N C [✓ L] P
No Cards Labels Pockets

Branches

NML
GLS
EXT

Shelf Locations

Rare
R.I.Cl
J.F.K.
Blatz
Ref
Juv.
Archiv
Thesis
mfilm
mcard
mfiche

FIGURE 2

NELINET Request Form

RI

LC ☐ 63-23627
L.C. Card Number

	Location	Copy-Shelf Statement	Volume
AT ☐	MAIN ;	c.1-2, c.3 R.I.CL	
AT ☐			
AT ☐			
AT ☐			

CN ☐ 574/.92074
Local Call Number

XC ☐
Extra Main Entry Cards

N C L [✓ P]
No Cards Labels Pockets

Branches

NML
GLS
EXT

Shelf Locations

Rare
R.I.Cl
J.F.K.
Blatz
Ref
Juv.
Archiv
Thesis
mfilm
mcard
mfiche

FIGURE 3

NELINET Request Form

RI

LC☐ 64-11130
L.C. Card Number

	Location	Copy-Shelf Statement	Volume
AT☐	MAIN	; C.1 ;	V.2
AT☐	NML	; C.2 ;	v.1-2
AT☐			
AT☐			

CN☐ Local Call Number

XC☐ Extra Main Entry Cards

N C L P
No Cards Labels Pockets

Branches

- NML
- GLS
- EXT

Shelf Locations

- Rare
- R.I.Cl
- J.F.K.
- Blatz
- Ref
- Juv.
- Archiv
- Thesis
- mfilm
- mcard
- mfiche

FIGURE 4

NELINET Request Form

RI

LC ☐ 64-14237
L.C. Card Number

AT ☐	MAIN	; 1 C. 1-3 ;	1 V. 2-3
	Location	Copy-Shelf Statement	Volume
AT ☐	EXT	; 1C. 1-2 ;	V. 1
AT ☐			
AT ☐			

CN ☐ 824/.8/1964
Local Call Number

XC ☐ 2
Extra Main Entry Cards

N C L [✓ P]
No Cards Labels Pockets

Branches

NML
GLS
EXT

Shelf Locations

Rare
R.I.Cl
J.F.K.
Blatz
Ref
Juv.
Archiv
Thesis
mfilm
mcard
mfiche

FIGURE 5

APPENDIX G

COMPRESSION WORD CODING TECHNIQUES: TRANSITION DISTANCE CODING, ALPHACHECK RECURSIVE DECOMPOSITION, AND SOUNDEX.

> "I have said enough to convince you that ciphers of this nature are readily soluble, and to give you some insight into the rationale of the development. But be assured that the specimen before us appertains to the very simplest species of cryptograph."
>
> --Edgar Allen Poe
> The Gold Bug

G1. INTRODUCTION

Cryptographic studies have documented much useful language data having application to retrieval coding. Because unclassified cryptographic studies are few, Fletcher Pratt's 1939 work[1] remains the classic in its field. Gaines[2] has the virtue of being in print, and the more recent cryptographic history of Kahn[3], while comprehensive, lacks the statistical data that made the earlier works valuable. The work coding problem for language processing, as opposed to cryptography, has been extensively studied by Nugent and Vegh[4]. Information theorists have contributed the greatest volume of literature on coding, and have added to its mathematical basis, largely from the standpoint of communications and error avoidance.

We present here a brief discussion of compression codes and their objectives, and then describe four compression codes having application to retrieval directories.

Transition Distance Coding is a new method that has been devised for this project. It is a randomizing code that results in short codes of high resolving power.

Alphacheck has also been devised for this project, and combines high readability with good resolution. It permits simple truncation to be used by means of applying a randomized check character that acts as a surrogate of the omitted portion. It appears to have the greatest potential, in directory applications, of the codes considered here.

Recursive Decomposition is a selected letter code that was devised by the author several years ago[4]. It has been tested and has the advantages of simple derivation and high resolution.

Soundex[5] is the only compression code that has achieved wide usage. It was devised at Remington Rand for name matching under conditions of uncertain spelling.

G2. OBJECTIVES OF COMPRESSION CODING

It is desired to transform sets of variable length words into fixed length codes that will maximally preserve word to word discrimination. In the final directories to be used, the codes for several elements will be accessible to enable the matching of several factors before a file record is selected. The separate codes for differing factors need not be the same length, though each type of code will be of uniform length, nor need the codes for differing factors be derived by the same process.

What we loosely call codes, must be formally ciphers. That is, they must be derivable from the data words themselves, and not require "code books" to determine equivalences. This is so because the file directories must be derivable from file items, entries in directory form must be derivable from an input query, and these two directory items must match when a record is to be extracted. The ciphers need not be deciperable for out application, and in general are not.

Fixed length is generally desirable for machine directories since this provides the rough equivalent and simplicity of a margin entry in a paper directory. We will examine the question of variable length directories and directory list structures in a later memo.

The functions of the codes will determine their form, and a code or file key designed to meet one objective will generally not be satisfactory for any other objective. We will clarify this point by illustrating some typical objectives:

(a) File key for extraction of records in approximate file order. (Sorting and Print-out Problem.)

Typical code construction rule: Take first six letters.

JOHNSEN ⇒ JOHNSE
JOHNSON ⇒ JOHNSO
JOHNSTON ⇒ JOHNST
JOHNSTONE ⇒ JOHNST

(b) File key for extraction of records under conditions of uncertainty of spelling (Airline reservation problem.)

Typical code construction rule: Vowel Elimination or Soundex.

Typical matching rule: Best match.

Vowel Elimination	Soundex
JOHNSEN ⇒ JHNSN	J525 ⇒ J52
JOHNSON ⇒ JHNSN	J525 ⇒ J52
JOHNSTON ⇒ JHNSTN	J5235 ⇒ J52
JOHNSTONE ⇒ JHNSTN	J5235 ⇒ J52

(c) File key extraction of records from accurate input, with objective of maximum discrimination of similar entries (cataloging search problem.)

Typical code construction rules: Recursive Decomposition Coding or Transition Distance Coding.

Recursive Decomposition	Transition Distance
JOHNSEN == JHNSEN	BFTZ
JOHNSON == JHNSON	DNWU
JOHNSTON == JHSTON	ZIKY
JOHNSTONE == JHSONE	ECRC

In file keys we are concerned with presently, we assume accurate input data and the objective is maximum discrimination. Since it would be nice to have our cake and eat it too, we would like a code to be as discriminating as Transition Distance Coding and to be as readable as truncation coding. We achieve this, possibly, by combining the two codes into one, with an initial portion truncated and a final check character representing the remainder via a compressed Transition Distance Code: Alphacheck.

(d) File key for human readability and high word to word discrimination.

Possible code construction rules: Alphacheck: Simple truncation plus a terminal check character.

JOHNSEN ==> JOHNSV
JOHNSON ==> JOHNSX
JOHNSTON ==> JOHNSD
JOHNSTONE ==> JOHNS3

We describe these procedures in the following sections.

G3. TRANSITION DISTANCE CODING

It is axiomatic that randomizing codes give the greatest possible discrimination for a given code space. The whole trick of creating a good compression code is to eliminate the natural redundancy of English orthography, and preserve discrimination in a smaller word size.

Letter-selection codes can only half accomplish this, due to the skewed distribution of letter usage. They can eliminate the higher frequency components, but they cannot increase the use of the lower frequency components.

Randomizing codes - often called "hash" codes, properly quasi-random codes - can equalize letter usage and hence make best use of the code space. Prime examples here are the variants of Gödel coding devised by Vegh[4] in which the principle of obtaining uniqueness via the products of unrepeated primes is exploited, as it is in the randomizing codes we consider here. The problem in design of a randomizing code, is that the results can be skewed rather than uniformly distributed due to the skewed nature of the letters and letter sequences that the codes operate on.

In Transition Distance Coding, we overcome the natural bias of letters and letter sequences, by operating on a word parameter that is itself semi random in nature. We advance the following principle, not quite a theorem.

> Principle: Considering letters in their normal ordinal alphabetic position, and considering letter transitions to be unidirectional and cyclic, the distribution of transition distances in English words is essentially uniform.

In view of the fact that letter usage has an extremely skewed distribution, with a probability ratio in excess of 170 to 1 for the extremes, it is seen that the more uniform parameter of transition distances is a superior one for achieving randomized codes. The relative uniformity of transition distance needs further investigation, but one typical letter diagram sample from Gaines[2] with 9999 transitions (means number of occurrences of each distance = 385) yielded a mean deviation of 99 and a standard deviation of 123, and an extreme probability ratio of 3.3 to 1 for the different transition distances from 0 to 25. The distribution can be made more uniform by letter permutation. Permutation is used in the algorithm for Transition Distance Coding but not in Alphacheck. It's value will be determined.

G3.1 ALGORITHM

The method of Transition Distance Coding is used to operate on a variable length word to achieve fixed length alphabetic or alphanumeric codes that exhibit quasi-random properties. The code is formed from the modulo product of primes associated with transition distances of permuted letters. The method is intended strictly for computer operation, as it is a simple program but an extremely tedious manual operation. There are five steps:

(1) Permute characters of natural language word. This breaks the diagram dependency that could make the transition distances less uniformly distributed. This step might be dispensed with if the resulting distributions prove satisfactory without it. The permutation process consists of

taking the middle letter (or letter right of middle for words with an even number of letters), the first, the last, the second, the next-to-last, etc. until all letters have been used. That is, for a letter sequence:

$a_1, a_2, \ldots a_i \ldots, a_n$

The following permutation is taken:

$$a_{\mathrm{Int}(\frac{n}{2}+1)},\ a_1,\ a_n,\ a_2,\ a_{n-1}, \ldots a_{(1+i)}, a_{(n-i)}, \ldots a_{\mathrm{Int}(\frac{n}{2}+1)+4\mathrm{Rem}(\frac{n}{2})}$$

where Int and Rem refer to the integer part and remainder, respectively. To illustrate a typical case:

JOHNSEN ==> N J N O E H S

(2) Take transition distances of the characters. We assign letters a position value corresponding to their normal ordinal alphabetic positions excepting Z, which we equate to 0, (e.g., A = 1, Y = 25, Z = 0), and take the transition distances between successive letters of the input sequence. Distance is measured unidirectionally in alphabetic order, and cyclicly (i.e., "around the bend," Z to A.) The sequence AX has the transition distance $N_X - N_A = 24-1 = 23$. Negative distances are converted to their positive cyclic distance ty taking their 26 complement. That is, the sequence XB has the transition distance $N_B - N_X = 2-24 = -22 \Longrightarrow 26-22 = 4$. To follow the 'JOHNSEN' example:

NJNOEHS ⇒ (14,10,14,15,5,8,19) ⇒ (22,4,1,16,3,11)
letter numbers   distances

(3) Associate with each transition distance, a corresponding prime number. Table G1 shows the primes corresponding to the transition distances. We begin with 5 so that the alphanumeric base (36) and all numbers are relatively prime. We follow the example above:

(22,4,1,11,3,11) ⇒ (89,13,5,61,11,41)
distances   primes

LETTER	LETTER POSITION AND DISTANCE VALUE	PRIME NUMBER
A	1	5
B	2	7
C	3	11
D	4	13
E	5	17
F	6	19
G	7	23
H	8	29
I	9	31
J	10	37
K	11	41
L	12	43
M	13	47
N	14	53
O	15	59
P	16	61
Q	17	67
R	18	71
S	19	73
T	20	79
U	21	83
V	22	89
W	23	97
X	24	101
Y	25	103
Z	0	107

TABLE G1

Letter Positions and Primes used in
Transition Distance Coding and Alphacheck

(4) Multiply these primes, modulo the capacity of the computer. Integer multiplication in single precision is effected, disregarding overflow. For a computer with an 18 bit word length containing a 1 bit sign position, we multiply modulo 2^{17}. That is, we disregard product portions that equal or exceed 131,072. For a machine of this type, then, we will be generating a quasi random number in the range of 0 to 131, 071. This is converted to alphanumeric form in the next step. Following the example:

$89 \times 13 \times 5 \times 61 = (352{,}885)\ \mathrm{Mod}2^{17} = 90{,}741$

$90{,}741 \times 11 = (998{,}151)\ \mathrm{Mod}2^{17} = 80{,}647$

$80{,}647 \times 41 = (3{,}306{,}527)\ \mathrm{Mod}2^{17} = 39{,}727$

(5) Convert to alphabetic or alphanumeric form. We now express the number derived above as an integer base 26 (alphabetic form) or base 36 (alphanumeric form). We will use a 4 digit code. In the case of alphabetic representation we use the letters to represent the numbers of their ordinal position (A=1, B=2, etc.), and use Z as zero. In alphanumeric form we would use the digits 0 to 9 to represent this range, and the letters A through Z would represent the range from 10 to 35.

Using the 18 bit word length we have assumed, the alphabetic form is as good as the alphanumeric. The range of the random number extends to 131,071; the range of 4 digit alphabetic representation extends to $(26^4-1) = 256{,}975$; the range of 4 digit alphanumeric representation extends to $(36^4-1) = 1{,}676{,}615$. Hence, the alphabetic representation is sufficient. We divide the random number successively by 26^3, 26^2, 26^1, and 26^0 to obtain the alphabetic form. We follow the example:

$39{,}727/26^3 = 2 + \mathrm{Rem}\ 4575 \Longrightarrow B$

$4575/26^2 = 6 + \mathrm{Rem}\ 520 \Longrightarrow F$

$520/26' = 20 + \mathrm{Rem}\ 0 \Longrightarrow T$

$0/26^0 = 0 \qquad \Longrightarrow Z$

JOHNSEN $\Longrightarrow$ BFTZ

G4. ALPHACHECK

Alphacheck is a means for creating a randomized alphanumeric check digit. When used with a selected letter compression code, it operates on the missing letters to generate a single character surrogate. We use it to add discrimination to a simple truncation code, and thereby we hope to attain a compression code that is both readable and resolving.

A process practically identical to that of Transition Distance Coding is used, except that at the final step the random number is taken modulo 36 and expressed as an alphanumeric character. The ten numeric digits represent themselves, and the letters A to Z represent the mod 36 numbers from 10 to 35, or their ordinal alphabetic value plus 9.

In this case, the difference between an alphabetic representation and an alphanumeric one is significant, since only one character is used, and the range of the Alphacheck character is much smaller than the range of the binary random number it is derived from.

The probability of no repetition of Alphacheck codes in a sample of size r, is a case of determining the probability of uniqueness for sampling with replacement from a population n, for which:

$$p = \frac{n!}{n^r\,(n-r)!}$$

where n is the range of the code, for alphanumeric Alphacheck, n = 36.

The median of the distribution of p, r_m gives the sample size for which the probability of uniqueness is 0.5. This is estimated by taking the logarithmic form of p, which yields a good approximation when n is large with respect to r.

$$\ln p \approx -\frac{r^2}{2n}$$

$$r_m \approx [2n \ln(.5)]^{1/2} = 1.18\, n^{1/2} = 7.08$$

By comparison, r_m for n=26 is 6.05; for n=131,072 (Transition Distance Coding in 4 characters and modulo 2^{17}) r_m is 427.

We may conclude that the alphanumeric Alphacheck (36 symbol) has a 50% expectation of uniquely resolving 7 otherwise identical 5-letter truncations of source words; this is a one word advantage over the 26 symbol alphabetic Alphacheck. Hence, we will use the alphanumeric form.

G4.1 ALGORITHM

It is not appropriate to use the identical randomizing method of T.D.C. (Transition Distance Coding), since this was designed to operate on full words, whereas we wish to operate on the omitted remainders of truncated words, which are often as short as two letters. When a two letter remainder exists only one transition distance is involved, and hence only one prime number; and the individual primes are not uniformly distributed modulo 36. Hence, in the case where only one transition distance exists, the corresponding prime is multiplied by two additional primes corresponding to the letters involved (Table G1.) If only two distances are involved, we associate another prime corresponding to the last letter. Since randomization is created largely by the multiplicative properties of the process, we insure that at least three factors are multiplied in all cases. Except for this difference in step three, the randomizing process is essentially identical to that of TDC. The steps are:

(1) If word is six letters or less take whole word, otherwise, take first five letters and compute an Alphacheck character for the sixth, based on the omitted letters.

(2) Take transition distances of the omitted letters (as in TDC).

(3) Associate with each transition distance a corresponding prime number (as in TDC). If only one transition distance exists, additionally associate prime numbers with the remaining letters. If only two transition distances exist, additionally associate a prime number with the last letter.

(4) Multiply these primes, modulo the capacity of the computer (as in TDC).

(5) Convert to alphanumeric form in 1 symbol, modulo 36, in which $0 \Rightarrow 1, \ldots, 9 \Rightarrow 9$, $10 \Rightarrow A$, $11 \Rightarrow B, \ldots, 35 \Rightarrow Z$.

The example of the JOHNS - names, shown in Table G2 illustrates the process.

Name	JOHNSEN	JOHNSON	JOHNSTON	JOHNSTONE
Truncated Portion	JOHNS	JOHNS	JOHNS	JOHNS
Remainder	EN	ON	TON	TONE
Letter #	5,14	15,14	20,15,14	20,15,14,5
Distance	9	25	21,25	21,25,17
Distance Primes	31	103	83,103	83,103,67
Letter Primes	17,53	59,53	53	-
Product	27,931	322,081	453,097	572,783
Mod 2^{17}	27,931	59,937	59,881	48,495
Mod 36	31	33	13	3
Alphacheck Character	V	X	D	3
Resulting Code	JOHNSV	JOHNSX	JOHNSD	JOHNS3

TABLE G2

Example of Key Generation by Alphacheck

G5. RECURSIVE DECOMPOSITION CODING

This method uses a frequency ordering of letters, and selection or rejection of a particular letter is based on that letter's relative order in the table with respect to the previous letter. It thus gives a statistical advantage, though not an absolute one, to the lower frequency letters. Since many words differ only in high frequency vowels (e.g., COMPUTE, COMPETE, COMPOTE), this relative order feature adds a randomizing aspect to selection that permits inclusion of occasional high frequency letters.

The frequency ordering used is taken from tables in Pratt[1]. Different word samples will yield slightly different orderings, but the cipher resolution is not sensitive to minor orderings. The Pratt ordering is:

E T A O N R I S H D L F C M U G Y P W B V K X J Q Z

The algorithm is:

"If a source word is longer than six letters, select the first letter and subsequent letters of lesser or equal ordering than the prior letter, and continue the process recursively until six letters remain. Words of six letters or less are reproduced in full and filled out with null symbols, where necessary, until a total of six characters is reached."[4]

Several examples will illustrate the system. Omitted letters are shown circled, and successive cycles are shown by arrows.

1. B Ⓘ B Ⓛ Ⓘ Ⓞ G Ⓡ Ⓐ P Ⓗ E R ⇒ B B G P E R
2. I Ⓝ F Ⓞ R M Ⓐ Ⓣ I Ⓞ N ⇒ I F R M I N
3. S H Ⓐ K Ⓔ S P Ⓔ A R Ⓔ ⇒ S H K Ⓢ P A R ⇒ S H K P A R
4. S M I T H ⇒ S M I T H □
5. K Ⓘ Ⓝ G Ⓢ F Ⓞ R D ⊖ Ⓢ M Ⓘ Ⓣ H ⇒ K Ⓖ F R D M H ⇒ K F R D M H
6. K Ⓡ I S H Ⓝ Ⓐ M Ⓞ O R Ⓣ H Ⓘ ⇒ K Ⓘ S H M Ⓞ R H ⇒ K S H M R H

In some very rare cases, an emerging cipher may have more than six letters in descending sequence, so that it will not decompose further. In such cases the final letters are eliminated until six remain.

Most words, however, will reduce in one or two cycles. In a test of 55,000 words only one was found requiring four cycles. A few extreme cases do exist, however: the longest ever found required six cycles:

7. A N Ⓣ I D Ⓘ S Ⓔ S Ⓣ A B Ⓛ Ⓘ S H M Ⓔ N Ⓣ A R I Ⓐ N I S M⇒

A N I D Ⓢ S Ⓐ B Ⓢ H M Ⓝ Ⓐ R I Ⓝ I S M⇒

A N I D Ⓢ B Ⓗ M Ⓡ I I S M⇒

A N I D B Ⓜ Ⓘ I S M⇒

A N I D B Ⓘ S M

A N I D B Ⓢ M

A N I D B M

Only slightly shorter, the longest word in Shakespeare's works (*Love's Labour's Lost* V.i) reduces in three recursions:

8. H Ⓞ N Ⓞ R I F Ⓘ C Ⓐ B Ⓘ L Ⓘ Ⓣ U Ⓓ Ⓘ Ⓝ I Ⓣ A Ⓣ I B Ⓤ Ⓢ⇒

H Ⓝ R I F C B Ⓛ U Ⓘ Ⓐ I B⇒

H Ⓡ I F C B Ⓤ Ⓘ B⇒

H I F C B B

Even Mary Poppins' sesquipedalian ecphonesis crumbles to six letters in three recursions:

9. S U P Ⓔ R C Ⓐ L Ⓘ F Ⓡ Ⓐ G Ⓘ L Ⓘ S Ⓣ I C Ⓔ X Ⓟ Ⓘ Ⓐ L Ⓘ D Ⓞ C Ⓞ U Ⓢ⇒

S U P R C Ⓛ F G Ⓛ Ⓢ Ⓘ C X Ⓛ Ⓓ C U⇒

S U P Ⓒ Ⓕ G Ⓒ X Ⓒ U⇒

S U P G X U

The prime advantages of the method are its computational simplicity and its resolution. The elimination requires only table lookup and no multiplications; and the compression is readily done manually. The resolution is apparently as good as one can get with a selected letter compression code. It effectively flattens the high portions of the letter frequency curve, though unlike a randomizing code, it cannot totally equalize the distribution. The resolution, however, is quite good. Specifically in a test of 4362 words (chosen from the secretary's handbook *20,000 Words*), only thirty of the six letter ciphers (about 0.61%) were non-unique and of the non-unique ciphers all were simple pairs except for one instance of three occurrences. The method compresses quickly: since all non-initial letters have a .5 probability of being retained, the expected length, 1, of an n letter word after r recursions is:

$$L = 1 + \frac{n-1}{2^r}$$

This indicates that a 43 letter word may be expected to compress to six letters in three recursions.

G6. THE SOUNDEX CODE

The Soundex code[5], though widely used, is of obscure origin and has been attributed to Remington Rand. It is a phonetic code that tends to create identical codes from similar sounding names. If is useful for name searching under conditions of uncertainty of spelling, such as occurs in the airline reservation problem where it is often required to match a telephoned name in a machine file. The code has five steps:

1. Retain first letter of anme as first letter of code.

2. Eliminate vowels, W, H, and Y.

3. Eliminate the second consonant of a double consonant pair.

4. Replace the following letters by numbers:

B,P,F,V	1
C,G,J,K,Q,S,X,Z,SC,CH,SCH,CK	2
D,T	3
L	4
M,N	5
R	6

5. Take the first three or four symbols, and add zeros if insufficient phonetic sounds.

The example below illustrates the process:

JOHNSEN ⟹ JNSN ⟹ J525 ⟹ J52
JOHNSON ⟹ JNSN ⟹ J525 ⟹ J52
JOHNSTON ⟹ JNSTN ⟹ J5235 ⟹ J52
JOHNSTONE ⟹ JNSTN ⟹ J5235 ⟹ J52

REFERENCES

1. Pratt, Fletcher *Secret and Urgent, the Story of Codes and Ciphers* Blue Ribbon Books, Garden City, New York 1939.
2. Gaines, Helen Fouche' *Cryptanalysis* Dover, New York, 1956.
3. Kahn, David *The Codebreakers* Macmillan Company, New York, 1967.
4. Nugent, William R. and Vegh, Alexander *Automatic Word Coding Techniques for Computer Language Processing* Report RADC-TDR-62-13 February, 1962 Volume I: AD-272-401, Volume II: AD-272-402.
5. Wright, M.A. "Mechanizing a Large Index; Appendix: The Soundex Code" *The Computer Journal* v.3, July, 1960 p.33.

APPENDIX H: SAMPLE CARDS AND LABELS

SELIN LABELS
(for spine
of book)

LB
1051
.S7239

KF
9625
.T5

LB
1576
.T56

PRESSURE
SENSITIVE
LABELS
(for book
pockets)

B
825
.P57
1967

HD
5764
.A6
K5

PQ
4835
.17
Z539

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725 MANAGEMENT AUDIT--CASE STUDIES.

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725 Business policy

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725 approach, by William T. Greenwood.
New York, Macmillan [1967]
xiv, 656 p. illus., maps. 24 cm.
Includes bibliographical references.
1. Management audit--Case studies.
I. Title.

67-14417
658

HD Greenwood, William T., comp.
38 Business policy; a management audit
.G725 approach, by William T. Greenwood.
New York, Macmillan [1967]
xiv, 656 p. illus., maps. 24 cm.
Includes bibliographical references.
1. Management audit--Case studies.
I. Title.

n.h.
HD38.G725

67-14417
658

This library requires
four main entries.

H - 2

T
15
Technology in western civilization.
Edited by Melvin Kranzberg [and]

TECHNOLOGY AND CIVILIZATION.

T
15
Technology in western civilization.
Edited by Melvin Kranzberg [and]

TECHNOLOGY--HISTORY.

T
15
Technology in western civilization.
Edited by Melvin Kranzberg [and]

Pursell, Carroll W., ed.

T
15
Technology in western civilization.
Edited by Melvin Kranzberg [and]

Kranzberg, Melvin, ed.

T
15
.T43
Technology in western civilization.
Edited by Melvin Kranzberg [and]
Carroll W. Pursell, Jr. Executive

T
15
.T43
Technology in western civilization.
Edited by Melvin Kranzberg [and]
Carroll W. Pursell, Jr. Executive
editors: Paul J. Grogan [and] Donald
F. Kaiser. New York, Oxford
University Press, 1967-
v. illus., maps, ports. 24 cm.
Bibliography: v.1, p. 745-774.
Contents.--v. 1. The emergence of
modern industrial society, earliest
times to 1900.

(Cont. next card)

67-15129

T
15
Technology in western civilization.
1967 (Card 2)

TECHNOLOGY AND CIVILIZATION.

T
15
Technology in western civilization.
1967 (Card 2)

TECHNOLOGY--HISTORY.

T
15
Technology in western civilization.
1967 (Card 2)

Pursell, Carroll W., ed.

T
15
Technology in western civilization.
1967 (Card 2)

Kranzberg, Melvin, ed.

T
15
.T43
Technology in western civilization.
1967 (Card 2)

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.T43
Technology in western civilization.
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1. Technology--Hist. 2. Technology
and civilization. I. Kranzberg,
Melvin, ed. II. Pursell, Carroll W.,
ed.

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